

# B-57 CANBERRA

in action



Aircraft Number 77

squadron/signal publications



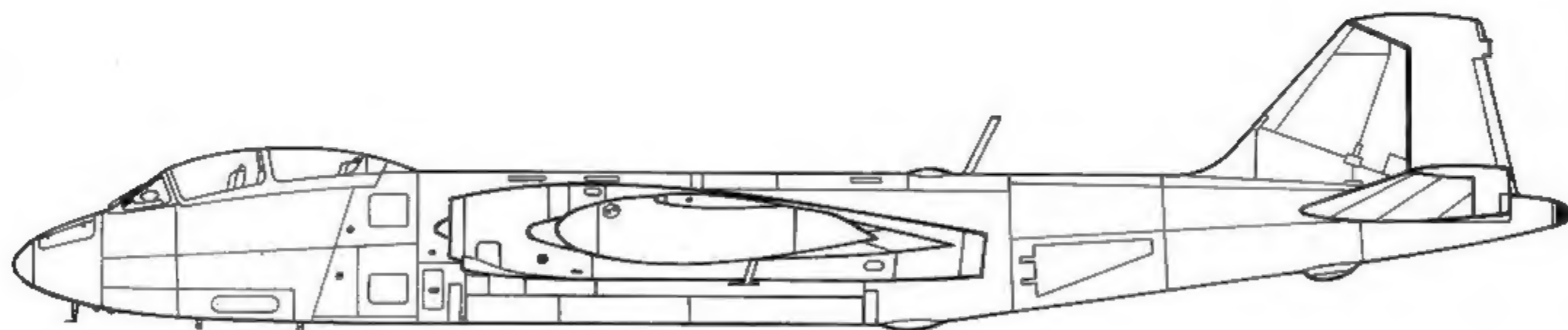
# B-57 CANBERRA

**in action**

**by Jim Mesko**

**Color by Don Greer**

**Illustrated by Perry Manley**



**Aircraft Number 77**



**squadron/signal publications, inc.**



A B-57G Canberra of the 13th BS, 8th TFW, based at Ubon, Thailand, armed with GBU-12 Laser Guided Bombs on a night mission over the Ho Chi Minh Trail during 1971.



## Dedication

### Mike Lyons 1944-1984

This book is dedicated to the memory of Mike Lyons who passed away after a long and courageous battle against cancer. Mike was an avid modeler and aviation historian, but most importantly, a good friend. Anyone who knew him through his outstanding work at the Silver Hill Restoration Facility of the Smithsonian Institution shares in the loss of this very special individual who constantly gave of himself to everyone who asked for help on aviation matters. Mike was a unique person and the world is a lesser place without his presence, for people of his character are rare indeed. May this book in some small way serve as a memory and tribute to Mike.

Jim Mesko Akron, Ohio 1986

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Collect Air Photos

Bob Taylor

Greg Biezechad

General Dynamics

Robert Heim

Ben Knowles

George Cockle

J E Rotramel

Dave Menard

Pat Mesko

Rusty and Bonzo

A B-57 Canberra takes off past Army UH-1 Hueys, as clouds begin to roll in from the mountains in the background. Often the B-57s were forced to divert from Da Nang to other fields or make instrument approaches because of weather. (USAF)





# INTRODUCTION

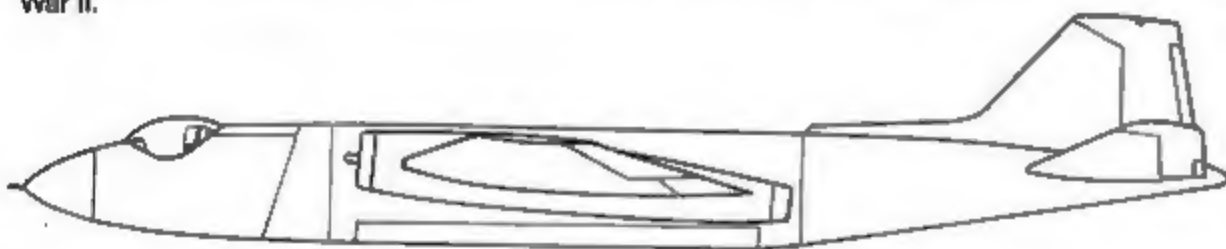
In 1951 the United States broke a long-standing tradition by purchasing a foreign military aircraft to be manufactured in quantity for the US Air Force. Why had the US Government opted to purchase a foreign aircraft in preference to an American designed aircraft? The answers to this question are many and varied, but in retrospect the decision proved to be a correct one and resulted in one of the most capable and enduring aircraft in US military aviation history — the B-57 Canberra.

The origins of the B-57 Canberra can be traced indirectly to the latter part of World War II when the *Luftwaffe* began combat operations with two jet propelled aircraft, the Messerschmitt Me 262 twin engined fighter and the Arado Ar 234 twin engined light bomber. Although the introduction of these two jet aircraft took place far too late to affect the outcome of the war, they nevertheless sent shock waves through the Allied air forces.

While the success of these early jet aircraft was limited, they did break new ground in aviation and proved that combat jet aircraft were not only feasible, but practical. However, while the Germans were the first to achieve practical success with jet aircraft, the British were not far behind. In fact, as early as 1944 William 'Teddy' Petter of Westland Aircraft Ltd, had proposed that all propeller driven tactical aircraft be replaced with jet aircraft. That same year Petter left Westland to become Chief Designer for The English Electric Company, Ltd, which had been approached by the Ministry of Aircraft Production to develop a jet aircraft.

Petter and his design team immediately began working on the project, and by June of 1945 the team had transferred their ideas onto paper. The new aircraft which they proposed was a mid-wing monoplane mounting a single Rolls-Royce jet engine in the fuselage. The two-stage centrifugal engine, with a five and a half foot diameter, was expected to deliver 12,000 pounds of thrust. Petter and his staff anticipated their new design having a cruising speed of 500 mph at an altitude of between 35 and 40,000 feet.

Since high altitude performance was one of the primary requirements of the design, speed was not considered a major objective. The design team did not anticipate that engines of sufficient power would become available during the aircraft's operational life, and thus were not concerned with stretching the design to handle supersonic flight. The aircraft's anticipated service ceiling of over 50,000 feet was far above that of contemporary fighters, and the expected maneuverability was on a par with these fighters, prompting designers to include no defensive armament. In many respects the new aircraft was designed to operate much as the famed de Havilland Mosquito during World War II.



## Canberra Prototype

However changes in engine technology led the English Electric team to reevaluate its original design, and after careful scrutiny, they decided to replace the single fuselage mounted engine with two axial-flow Rolls Royce AJ 65s, one mounted in each wing root. This change would allow for an expanded bomb bay, reduced fuel consumption (the axial-flow powerplants were more fuel efficient), as well as simplifying and lightening the aft section with the elimination of the fuselage jet tail pipe. As in the original design, the air intakes were in the leading edge of the wing next to the fuselage. When the new engines became available in late 1945, the English Electric team altered the basic design again by locating the engines about one third of the way out from the fuselage in each wing. This proved to be the last major change in the original design plans, and using these plans a wooden mock-up was built. After viewing the plans and mock-up, the RAF's Ministry of Supply certified that the new aircraft met their specifications, and in January of 1946 ordered four prototype aircraft under the designation English Electric A1, for testing and evaluation.

Work on the initial prototype began in early 1946 at Warton, an airfield used by the Eighth Air force during World War II. By the spring of 1949 the new aircraft was ready for flight tests. After a few days of taxi trials and short hops off the runway to test the controls, the prototype was flown for the first time on 13 May with English Electric test pilot, former RAF Wing Commander Roland Beamont at the controls. During this initial flight, lasting approximately thirty minutes, aside from a slight rudder problem, the prototype was found to handle extremely well with no problems being found in any of the systems. To solve the rudder problem English Electric technicians squared the rudder fin.

During subsequent flights the prototype was put through a number of tests, and maneuverability was found to be comparable with current fighters, and if operated within G and speed restrictions, the aircraft could be safely looped and rolled. Performance at both high and low altitude was found to be excellent, in particular low altitude handling characteristics of the aircraft were a pleasant surprise to both the company and the RAF. An aspect of the aircraft's design which eventually contributed to its longevity and performance was its low wing loading, low aspect ratio, and moderate wing thickness. These all combined to give the airplane excellent maneuverability and great structural strength. The new aircraft's performance provided the RAF with a bomber that could operate effectively from sea level up to ten miles above sea level. Many began touting it as the successor of the legendary Mosquito, and with good reason.

Production began almost immediately, but demand by the RAF was so great that English Electric alone could not fulfill the orders, and three other companies were licensed to help build the new bomber, now officially known as the Canberra. Eventually 546 Canberras were built before production was terminated, and would equip over thirty RAF bomber squadrons, numerous Commonwealth countries, as well as equipping a number of units in pro-Western countries.

(Below) In Korea aging Douglas B-26 Invaders carried out the tactical bombing role but a replacement was needed since the Invader was not up to the night interdiction assignment. These B-26Cs of the 17th Bomb Wing operated out of Pusan. (USAF)



# USAF Acceptance

American military observers had been present at many of the early flight trials of the Canberra and although impressed with its performance, their interest was purely academic since the new British aircraft fit no mission profile within the structure of the United States Air Force. The Americans believed that the Canberra was too small to be classed as a light bomber and too large to be used as a fighter. As such the Canberra was similar to the Mosquito, which never fit into a category within the Army Air Force during World War II.

However, a little over a year later interest in the Canberra from the United States surfaced as a result of its involvement in the Korean War. In Korea the US Air Force was called upon to fight a conventional war, something it was not fully equipped to do. And while American backed United Nation forces achieved air superiority early in the conflict, and were able to cut communist supply lines during the day, they were unable to stop the flow of supplies after dark. Using old Douglas B-26 Invaders the nightly flow of supplies was reduced but was never choked off completely. As a result, USAF officials began searching for a replacement for the World War II vintage B-26 Invader.\*

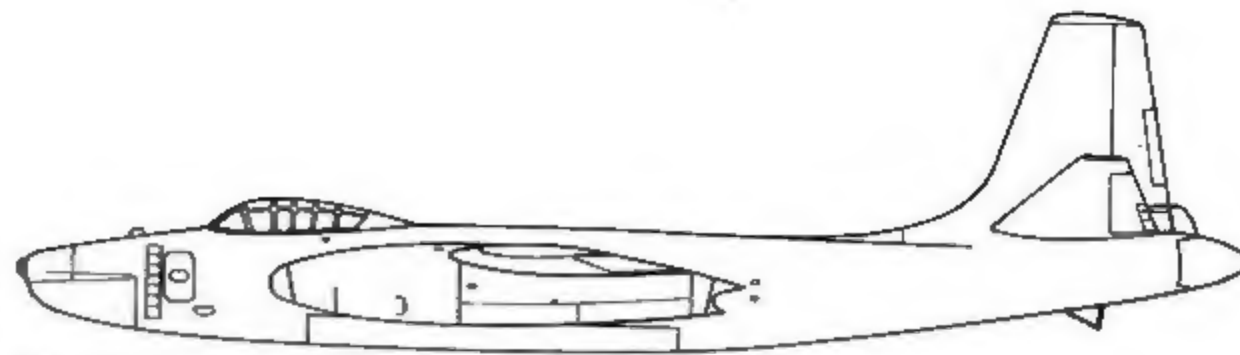
Of primary concern was the need to get the replacement aircraft in service immediately, before attrition depleted existing strength of Invaders. With this in mind, a committee of USAF officers was appointed to evaluate existing British, Canadian and US aircraft which might fit the role of a lightweight night intruder/interdiction aircraft. After studying the available aircraft, the committee settled on five — three American and two foreign — which might fit the Air Force's requirements. Two of the aircraft were already in USAF service, the North American B-45 Tornado, a four engined jet bomber, and the North American AJ-1 Savage, a Navy carrier aircraft powered by two reciprocating piston engines and one jet engine. The last American type was the Martin XB-51, a new design powered by three jet engines. Of the two foreign types one was the English Electric Canberra, and the other was the Canadian Avro CF 100 Canuck, a twin engined all-weather jet interceptor.

After evaluating the various types, the committee was unable to select a successor to the Invader, and while the Canberra appeared to have the best performance of the five, there was a strong faction which preferred the Martin entry. To settle the question the committee decided to conduct a fly-off between the five entrants at Andrews Air Force Base in November of 1950. This was later changed to February of 1951 when the Canberra's arrival was delayed.

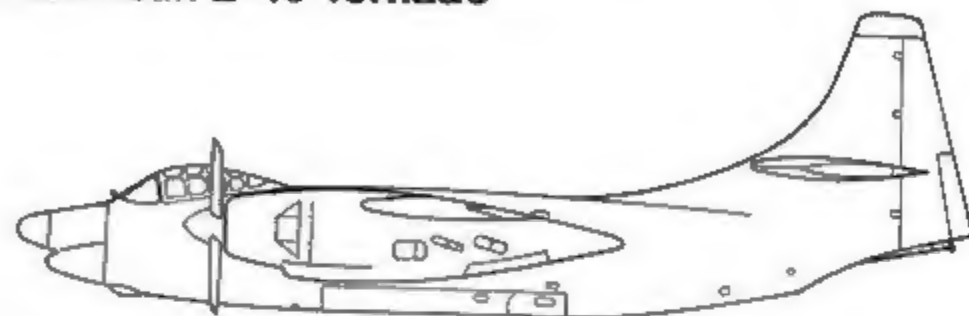
On 26 February all of the entries were ready for the demonstration. Each flight test was to last ten minutes, involving a tight turn in each direction over the observers, a slow and high speed pass, and a short field landing. While seemingly simple, the ten minute time limit would penalize any competitor that was not highly maneuverable.

As each aircraft roared down the runway the anticipation in the crowd began to build. The first competitor, the B-45 Tornado, could not complete the course in the allotted time. The next two, the AJ-1 Savage and the CF-100 Canuck, each completed the course in the required time, and with fairly good results. The XB-51 flew in from the Martin plant in Baltimore to participate in the fly-off. It went through the maneuverability tests but not the short field landing phase; instead, the XB-51 immediately returned to Baltimore without landing at Andrews Air Force Base. Finally, it was the Canberra's turn. English Electric test pilot Roland Beamont demonstrated his expertise with the Canberra, quickly putting the plane through its paces, completing the required course in slightly over six minutes. Beamont used the remaining three minutes to put on a spectacular show for the crowd before landing the Canberra. With the fly-off completed, there was no doubt as to the winner. None of the other aircraft had come close to matching the performance of the Canberra.

Evaluation results notwithstanding, the committee was still reluctant to support the unconditional procurement of the Canberra without evidence from the British government and English Electric that the aircraft would be available to the USAF in substantial numbers along with the necessary spare parts. Both the Canberra and the XB-51 were chosen, pending resolution of these issues. Only after the British government granted manufacturing rights to the United States was the Canberra selected for procurement as a night intruder with the USAF.



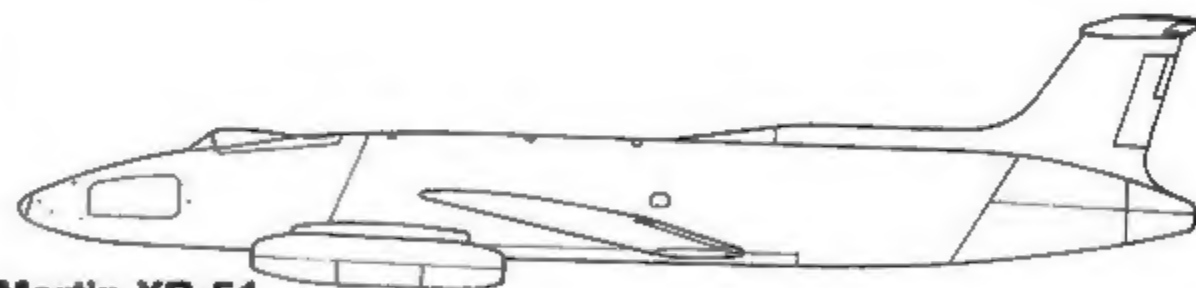
**North American B-45 Tornado**



**North American AJ-1 Savage**



**Avro CF-100 Canuck**



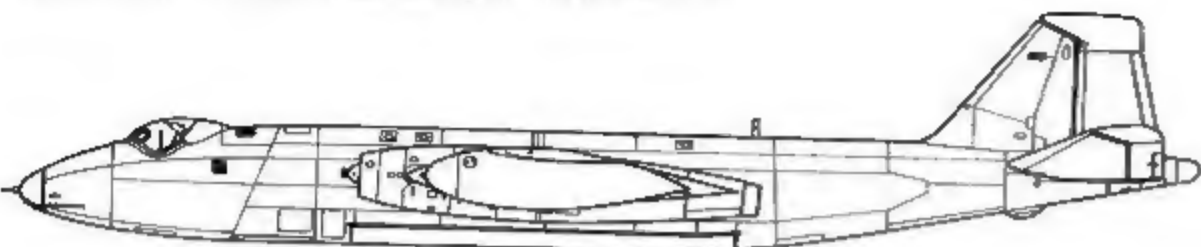
**Martin XB-51**



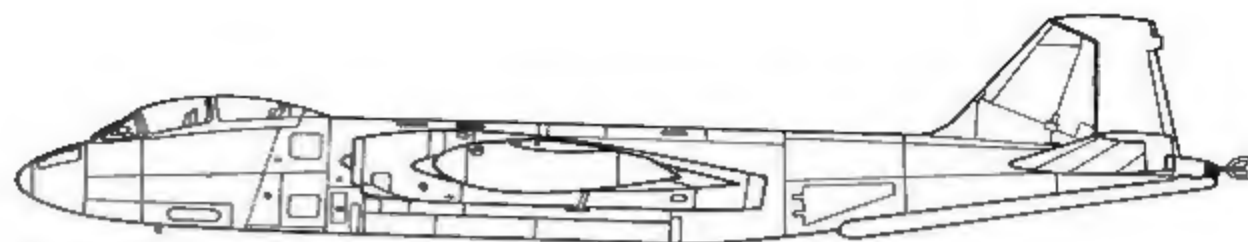
**English Electric B Mk 2 Canberra**

\*For an account of the Invader see the author's *A-26 Invader in Action* published by Squadron/Signal.

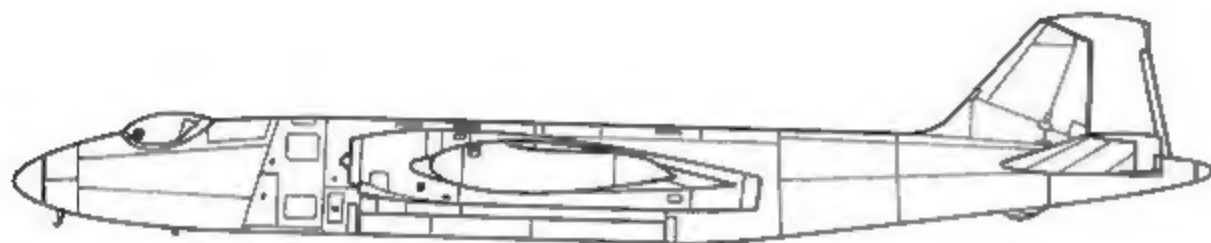
# B-57 DEVELOPMENT



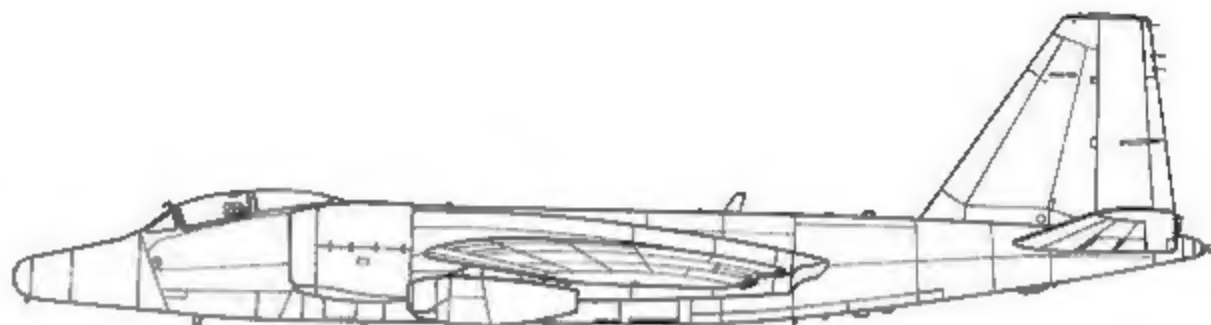
**English Electric Canberra B Mk 2**



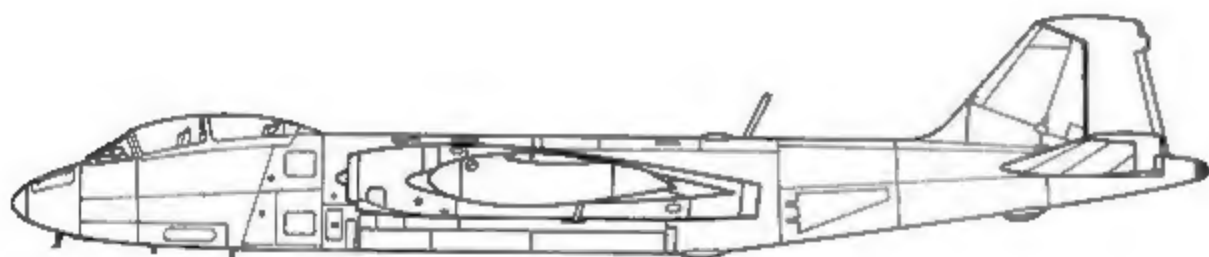
**B-57 E**



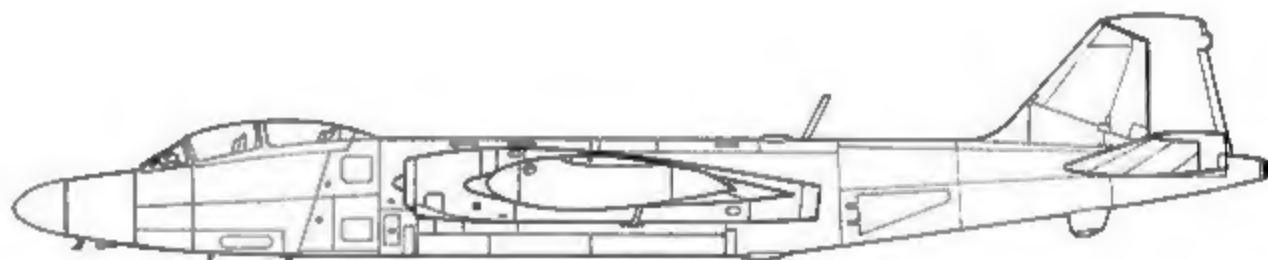
**B-57 A/RB-57A**



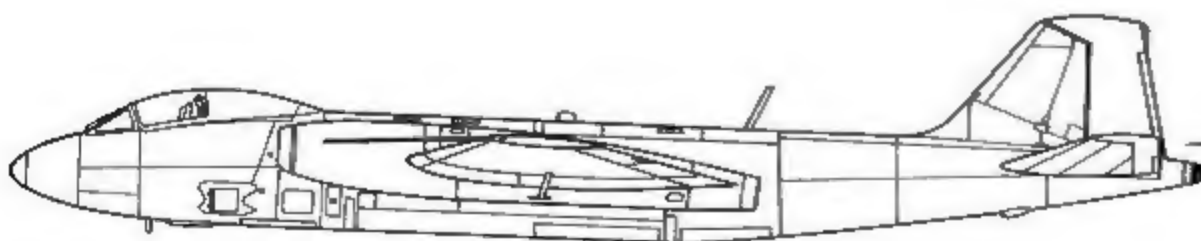
**RB-57 F**



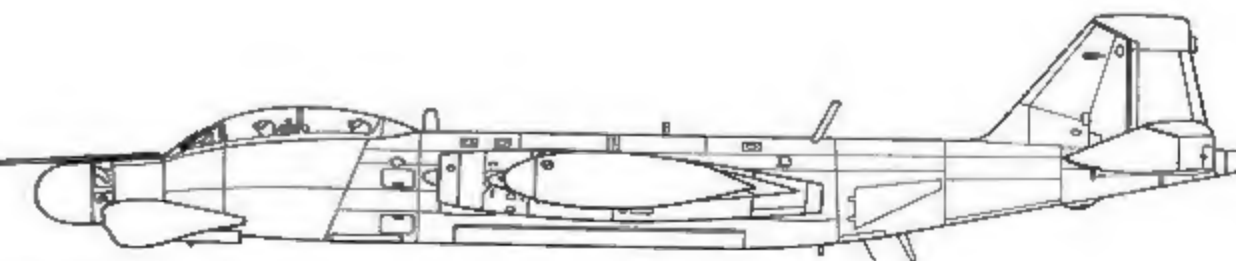
**B-57 B/C**



**All-Weather B-57 B (Pakistan)**



**RB-57 D**



**B-57 G**



# B-57A Canberra Bomber

## RB-57A Reconnaissance Canberra

Prior to making a final decision the USAF evaluation team discussed the possibility of Martin building the British Canberra should their XB-51 not be selected. Martin Aircraft readily agreed since it would assure them of a needed contract in the event the evaluation committee chose against their design. When the decision was finally made to build the Canberra in the United States, Martin took immediate steps to begin production.

The accord reached between England and the United States provided for the production of 250 Canberras, under the US designation B-57 Canberra. English Electric and Martin worked out a licensing agreement for the manufacture and sale of B-57 aircraft and spare parts to the US Air Force. Martin was permitted to subcontract components out to five companies since its facilities could not possibly handle every aspect of Canberra production.

The first set of drawings arrived from England in June of 1951 and work began to convert English measurements and fittings to their American counterparts. While the Canberra had been selected on an as is basis, numerous problems arose in converting the aircraft to American standards and meeting USAF requirements regarding tolerances, layout, and systems. Thirty-five major deficiencies were listed, but to stay within the as is restrictions, only six were slated for remedy.

At the request of the Wright Air Development Center, Martin submitted a revised design of the Canberra featuring components from their XB-51. This redesign incorporated a Canberra fuselage, a tandem cockpit, swept back wings with the engines embedded in the wings, and a T-tail. Under the designation B-57B Super Canberra, Martin proposed that this design be substituted for the English Canberra, claiming it could be ready for production during 1954. The Air Force turned down the Martin proposal since the procurement and introduction of a new and untried design was exactly what the selection board had sought to avoid.

Martin received its first pattern aircraft, Canberra WD932, in March of 1951, using it extensively for testing, evaluation, and performance verification. By June the need for a second test aircraft was obvious and a request was placed for an additional Canberra. The second pattern aircraft, Canberra WD940, arrived in September and was used for a variety of evaluations similar to those carried out with WD932. Test work continued without delay until December of 1952 when tragedy struck; the initial test aircraft crashed after losing a wing during a tight turn at 10,000 feet, killing the engineer/observer. Investigators concluded that the wing had failed due to overstress, even though the aircraft's G force limitation had not been exceeded. In particular, the death of the engineer/observer pointed up the poor escape possibility of this crew position which was deep in the fuselage.

The crash of Canberra WD932 induced the USAF to approve changes which eliminated the thirty-five deficiencies submitted by Martin engineers. It had become evident that the flaws in the basic design of the Canberra threatened its use as a USAF intruder. Reinforcement for these changes came from the British Ministry of Supply which had compiled and submitted a similar list of flaws and to English Electric.

Despite these problems work moved ahead at a steady pace with the first production B-57A rolling off the assembly line on 20 July 1953, just twenty-eight months after Martin received the initial contract. As Martin was gearing up for production of the B-57A, the USAF approved a redesigned variant of the B-57, forcing changes in Martin's production schedule. Anticipating the revised design only the first eight production aircraft were completed in the bomber configuration under the designation B-57A. The remainder of the aircraft in the initial production run were converted to the reconnaissance role under the designation RB-57A. Production of the RB-57A reconnaissance variant was limited to sixty-seven aircraft. Due to the additional cost required for engineering changes and re-tooling, the number of aircraft called for under the original fixed price contract was now reduced from 250 to 177.

Externally, the B-57A Canberra was essentially similar to the English Electric Canberra B Mk 2. Changes which differentiated the B-57A from the B Mk 2 were the repositioning of the navigator's window aft of the cockpit on the starboard side and the deletion of the windows on the port side of the fuselage. The pitot tube was relocated from the glazed nose cone of the B Mk 2 to a position beneath and aft of the B-57A glazed nose. The Martin Canberra was powered by a pair of 7,220 lb thrust Wright YJ65-W-1 jet engines surrounded by nacelles of a slightly different contour than those of the 6,500 pound thrust Rolls-Royce Avon 101 powered B Mk 2. An air intake contoured beneath each B-



(Above) Breaking a long standing tradition of purchasing American designs, the US Air Force chose the British designed English Electric Canberra, but only after English Electric granted Martin Aircraft of Baltimore manufacturing rights in the United States. The first production B-57A (21418) is preparing to take off on a test flight. In contrast to British Canberra the pitot tube has been relocated below the glazed nose, the starboard window been repositioned, the engine intakes have been recontoured, and new starter fairings have been installed. (USAF)

57A nacelle simplified the cooling system, eliminating the need for all but one of airducts mounted in the leading edge of the wing. The starter cartridge mounted in the center of the engine air intake received a more streamlined fairing on the B-57A. A shortened bomb bay was installed on the Martin-built Canberra, as well as multiple navigation lights on the tail cone.

The Air Force's decision to redesign the Canberra delayed delivery of the new aircraft to operational units considerably. The first unit to receive the reconnaissance version of the American built Canberra was the 363rd Tactical Reconnaissance Wing (TRW) at Shaw Air Force Base in South Carolina which began training in late 1954. A number of RB-57As were diverted to the Bomb Group (BG) at Langley AFB, Virginia for crew familiarization until the bomber version was available. Two additional reconnaissance units, the 10th and 66th TRW, both based in Europe, received the RB-57A in limited numbers during 1955 and 1956, however, by 1958 all three units had phased out the RB-57A in favor of other types. A number of RB-57As were assigned to Air National Guard units or were converted to test and electronic warfare aircraft where they saw service well into the 1960s. As RB-57A Canberras were withdrawn from military duty, a number were acquired by various civilian and government agencies for use in weather forecasting, high altitude flight inspection, or airframe instruction.

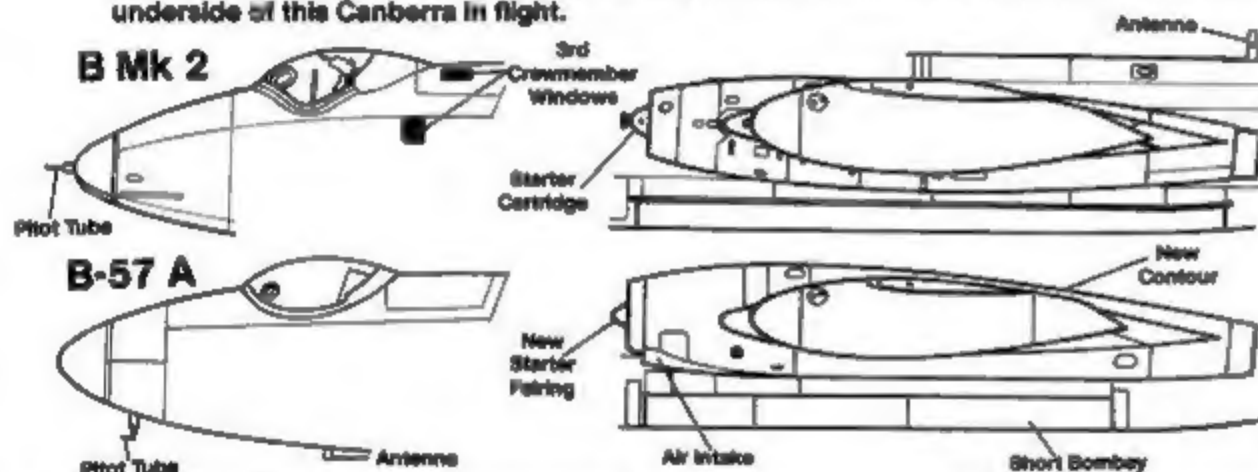
(Below) The broad wing of the Canberra provided the aircraft with excellent maneuverability and created an extremely stable bombing platform. The B-57A carried a two man crew instead of the three man British complement, consequently, the port side windows carried on the British Canberra were omitted on the American Canberra. The long probe on the port wing was fitted for flight testing. (USAF)



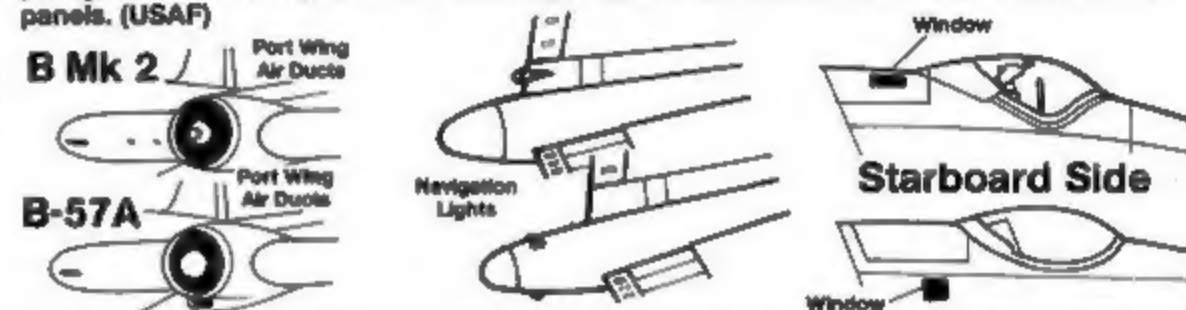




(Above Left) The second production B-57A bomber makes a low level pass at Edwards AFB, California during flight tests. Initial dissatisfaction with the B-57A resulted in only eight bomber variants being produced with the remainder of the A series being modified to the tactical reconnaissance role. The shortened bombbay of the Martin built B-57 can be seen on the underside of this Canberra in flight.



(Above Right) The Canberra's straight forward design gave the new aircraft a sleek appearance when viewed from head on. Visibility from the bubble canopy was good, although the curved plexiglass made it impossible to use a gunsight due to the distortion of the laminated panels. (USAF)



(Below) Martin ran two work shifts at its plant until the first four bomb groups were equipped with the Canberra. The aircraft being towed out of the hanger is an RB-57A on its way to the paint shop for a coat of Anti-searchlight Black. The Canberra behind its starboard wing is one of the eight B-57A bombers produced before production was converted to building RB-57A reconnaissance variants. (USAF)





(Above Left) RB-57As on the ramp at the Martin plant receive last minute adjustments before being turned over to the Air Force. The majority of these Canberras were assigned to the 363rd Tactical Reconnaissance Group at Shaw AFB, South Carolina which was the first tactical unit to receive the new aircraft. The B-57A was powered by a 7,200 pound thrust YJ67 Sapphire jet engine mounted in each nacelle, giving it a slightly different contour than the Avon 101 powered English Electric B Mk 2. (USAF)



(Above Right) A factory fresh RB-57A sits on the runway of Shaw AFB, South Carolina in January of 1955 flanked by a pair of Douglas B-26 Invaders, which it replaced, and a number of other World War II era aircraft, all of which were assigned to the 363rd TRG. The number of air inlets in the leading edge of the inside port wing were reduced from three on the British Canberra to one on the Martin-built Canberra. (USAF)

(Below Left) The distinctive Red and White checkerboard tail of the 363rd TRG is prominently carried on a Canberra making a practice flight over the South Carolina countryside. All markings except for the national insignia are Red, and the finish on the horizontal tail control surfaces is Silver. The B-57 featured dual navigation lights on both the top and bottom of the rear tail cone, replacing the single light at the base of the rudder support on the Canberra B Mk 2. (USAF)

(Below Right) Four RB-57As of the 363rd TRG fly in formation over the rolling farmland of South Carolina. The 363rd TRG was the only USAF Canberra reconnaissance unit to be stationed in the United States, all others being deployed overseas. The Red and White checkerboard markings on the vertical stabilizer can be seen reflected on the Glossy Black of the horizontal stabilizer. (USAF/Martin via Lyons)







(Above Left) RB-57A Canberras were painted in a special Anti-searchlight Black paint which made them practically invisible in a searchlight beam. This paint was developed during World War II and was first used on the P-51 Black Widow. The bombs are a special photo flash type for use on night missions. (USAF)

(Below Left) A number of 88th TRW Canberras retained a Natural Metal finish. The tail and wingtip flashes are Yellow with White stars. (Von Geffen via Bishop)



(Below) The Federal Aviation Administration acquired a pair of B-57As for use in studying high altitude jet stream routes and for high altitude flight inspection. N96 crashed in 1960 following a control column malfunction. (Anderton via Bishop)



(Above Right) The RB-57A featured dive brakes (later called speed brakes) to control the aircraft's speed during descent. These brakes emerge from the upper and lower surfaces of both wings and can be seen just above the inside bar of the national insignia on the upper port wing and bisecting the 'US' on the starboard wing. (USAF Museum via Taylor)

(Below Right) Two units in Europe, the 10th and 88th TRW, received the RB-57A. This Canberra of the 1st Tactical Reconnaissance Squadron of the 10th TRW carries tail markings in Yellow and Black. (R M Robinson via Bishop)



# B-57B B-57C

Under the designation B-57B Martin personnel began work on revising the Canberra immediately after receiving Air Force approval. Drawing upon their experience with the XB-51 and the Super Canberra design Martin engineers a modification program that encompassed the numerous changes required to turn the B-57 Canberra into a first line USAF combat aircraft. What would emerge from this modification program would be an exceptional aircraft whose British lineage was obvious, but with a decidedly American flare.

The most prominent external change to the B-57B was the introduction of an elongated canopy covering a reconfigured cockpit with the pilot and navigator seated in a tandem arrangement replacing the bubble-shaped pilot's canopy of the B-57A. Redesigning the cockpit resulted in a number of changes which reflected the role envisioned for the B-57B. Not only did the new canopy offer a tremendous increase in overall visibility, but moving the navigator up from deep inside the fuselage to the rear of the reconfigured cockpit provided a second pair of eyes for observation, and made escape for the navigator far easier, an important psychological point for gaining crew acceptance of the new aircraft. A new windscreen allowed the addition of a gunsight, which had not been carried on the unarmed British Canberras. A gunsight fitted to one of the Mk 2 test Canberras had revealed that the double curved layers of glass flexed with changes in pressure and temperature, particularly when the aircraft operated at lower altitude levels, making it impossible to properly harmonize the gunsight and reducing accuracy below acceptable gunnery standards. To solve this problem the new canopy had a flat panel of glass on the front of the windscreen.

The B-57B mounted four hard-points under each wing for rockets, bombs or napalm. The first ninety production aircraft had four fifty caliber M-3 machine guns mounted in each wing outboard of the engine nacelles, which were mounted in pairs, one above the other in a slightly off-set pattern. However, after the ninety-first production B-57B, the machine guns were replaced with a pair of 20mm M39 cannons in each wing.

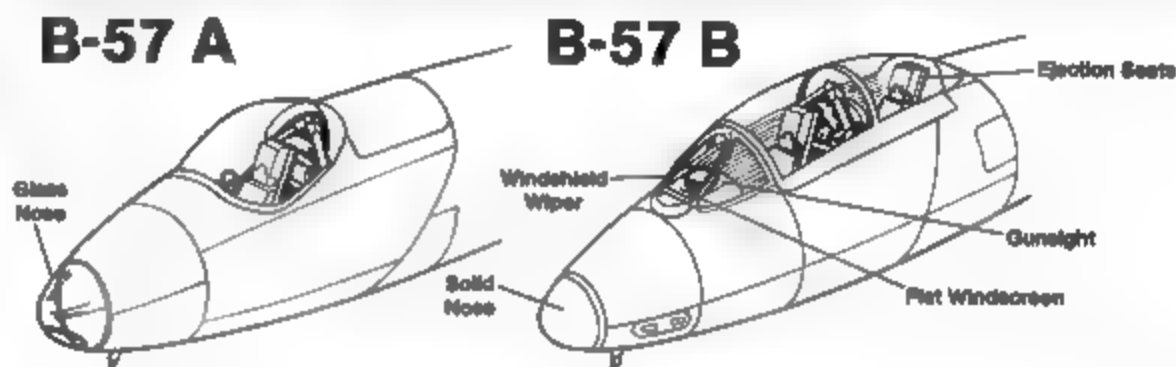
The original design included spoilers, or dive brakes on both the upper and lower surface of the wings to slow the aircraft down. However, these were found to be relatively inefficient for controlling speed, particularly during a dive, and if the pilot was not careful while diving the aircraft's speed could easily exceed the airframe limits, sometimes with fatal results. The addition of speed brakes installed in the aft fuselage helped eliminate this problem, and also improved maneuverability during the ground attack mission. The wing mounted spoilers were retained and linked to the controls of the fuselage speed brakes.

A unique feature from XB-51 design which Martin incorporated into the B-57 Canberra program was a seventeen foot, one piece rotating bomb-bay door. The bomb-bay door, which rotated on a pivot point at each end the bomb bay, needed only four seconds to open and six seconds to close. The rotation speed of the bomb-bay doors allowed for higher speeds during bomb runs since the buffeting normally associated with the opening and closing of regular bomb bay doors was eliminated, making the B-57B a far more stable bombing platform. Attachment points on the door allowed a variety of ordnance to be carried. The bomb-bay doors could be preloaded with ordnance allowing for extremely rapid turnabout of the aircraft; the empty doors could be removed and a new door preloaded with ordnance could be rolled out on a trolley and winched into place. The rotating bomb-bay door sealed very tightly, eliminating much wind resistance during flight. The rotating bomb-bay would later prove especially helpful when the B-57 used the Low Altitude Bombing System (LABS). This system allowed an aircraft to lob a bomb in an upward arc to a target while the aircraft turned safely away. With its speed and maneuverability, the B-57 Canberra was ideal for this system and proved to be the most accurate of the various aircraft employing LABS.

Internal changes included the addition of the Shoran bombing system for use by the navigator/bombardier and an APW-11 Bombing Air Radar Guidance System to aid the pilot during the bomb run. In addition an APS-54 Radar Warning System was fitted to detect other aircraft in close proximity. Accommodation of these changes required a complete revamping of the cockpit wiring and control systems.



(Above) The B-57B had a completely redesigned nose and cockpit with the pilot and navigator being seated in a tandem arrangement under a single canopy. (USAF Museum via Taylor)



(Below) The new canopy increased visibility and added an extra pair of eyes in the cockpit. Previously, the navigator in the B-57A had only marginal visibility from his position buried within the fuselage. (USAF Museum via Taylor)





An electrically-ignited cartridge starter system was introduced replacing the manual cartridge starter system. This unique starter system used a single shot cartridge loaded in a breech located in a fairing in the center of the engine air intake. When ignited the cartridge directed ten seconds of force against a starter turbine which was linked by a clutch system to the engine. The cartridge explosion drove the engine up to starting speed, eliminating the need for ground powered starter units, making it somewhat easier to deploy the B-57 in more primitive facilities. Initially, the starter cartridges emitted a dense cloud of black smoke, often startling novice ground personnel when they first saw it in operation. Believing the aircraft was on fire, ground crewmen would sometimes hose down the engines and fuselage, much to the displeasure of the flight crew, especially if the canopy was open. Eventually, a cleaner burning cartridge was developed, eliminating much of the smoke.

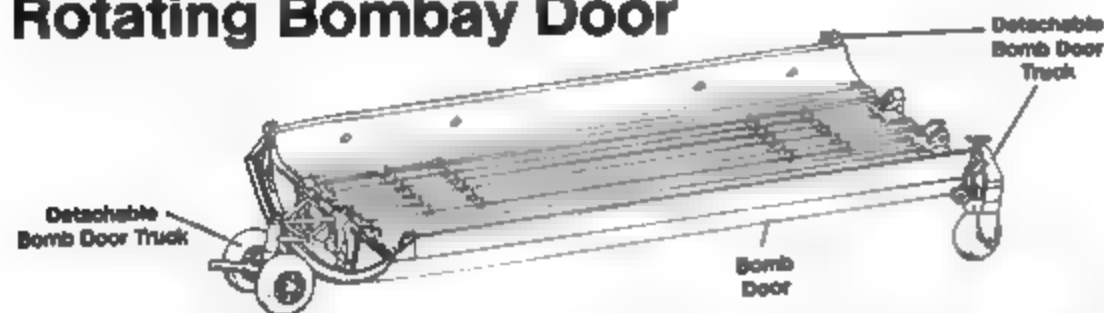
Although scheduled for introduction in February of 1954, production problems and delays in procurement of engines postponed deliveries of the B-57B until July.

## B-57C

During 1955 USAF ordered 158 additional Canberras, including thirty-eight airframes of a trainer version of the B-57B with a complete set of controls in the rear seat under the designation B-57C. The B-57C Canberra trainer differed from the B-57B only in the rear seat controls, otherwise, the two aircraft were identical. The dual-controlled B-57C was used primarily as a trainer by bomber units, but could be employed as a bomber if necessary.

Late changes to the B-57B included the addition of blisters on the top and bottom of the fuselage aft of the wing, and a new squared fuselage antenna. A number of B-57Bs also featured a modified rudder with a prominent trim tab.

## Rotating Bomb Bay Door



(Below Left) The B-57B bomb bay door could be preloaded and then winched into place. Designers believed that this feature would allow greater flexibility when the Canberra was operating from primitive airfields since the bomb bay doors could be flown to an airfield fully loaded and quickly attached to aircraft. However, this system was never put into use operationally. (Bieszchad)



(Above) The new canopy made it possible to mount a gunsight behind the flat plexiglass windscreen. (USAF)

(Below Right) The rotating bomb bay had been designed for the Martin XB-51, which utilized a detachable one-piece rotating bomb bay door allowing higher approach speeds during the bomb run due to the elimination of buffeting caused by wind resistance when normal bomb bay doors were opened during the bomb run. (Bieszchad)

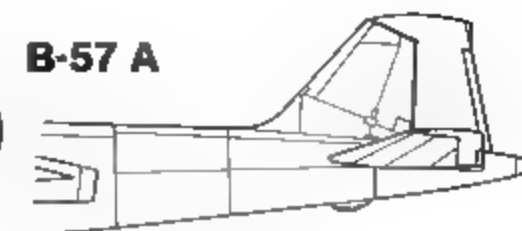




(Above) The B-57B Canberra took on a distinctly American character. This, one of the initial B-57B production aircraft ■ painted ■ the overall Glossy Black scheme in which the B variants were usually delivered. All lettering and numbers are Red. (USAF)



**B-57 A**



**B-57 A**



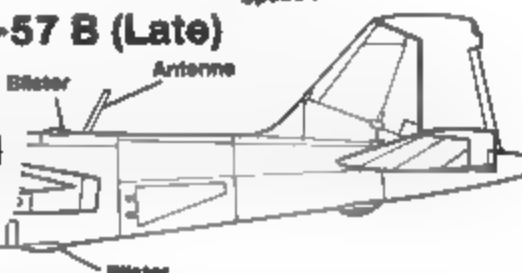
**B-57 B (Early)**



**B 57 B (Early)**



**B-57B (Late)**



**B-57 B (Late)**

(Below) The Air Force conducted a series of tests to determine the optimum means of employing the Canberra, giving due consideration to its high speed and maneuverability. Of particular importance were tests exploring the range of ordnance which the Canberra could effectively deliver. This B-57B is fitted with napalm canisters, a weapon the Canberra would employ with devastating effect in Vietnam. (USAF)







(Above) A ramp full of natural metal Canberras, the first of which has its rear fuselage mounted speed breaks in the open position. The new square type of blade antenna can be seen silhouetted against the sky.

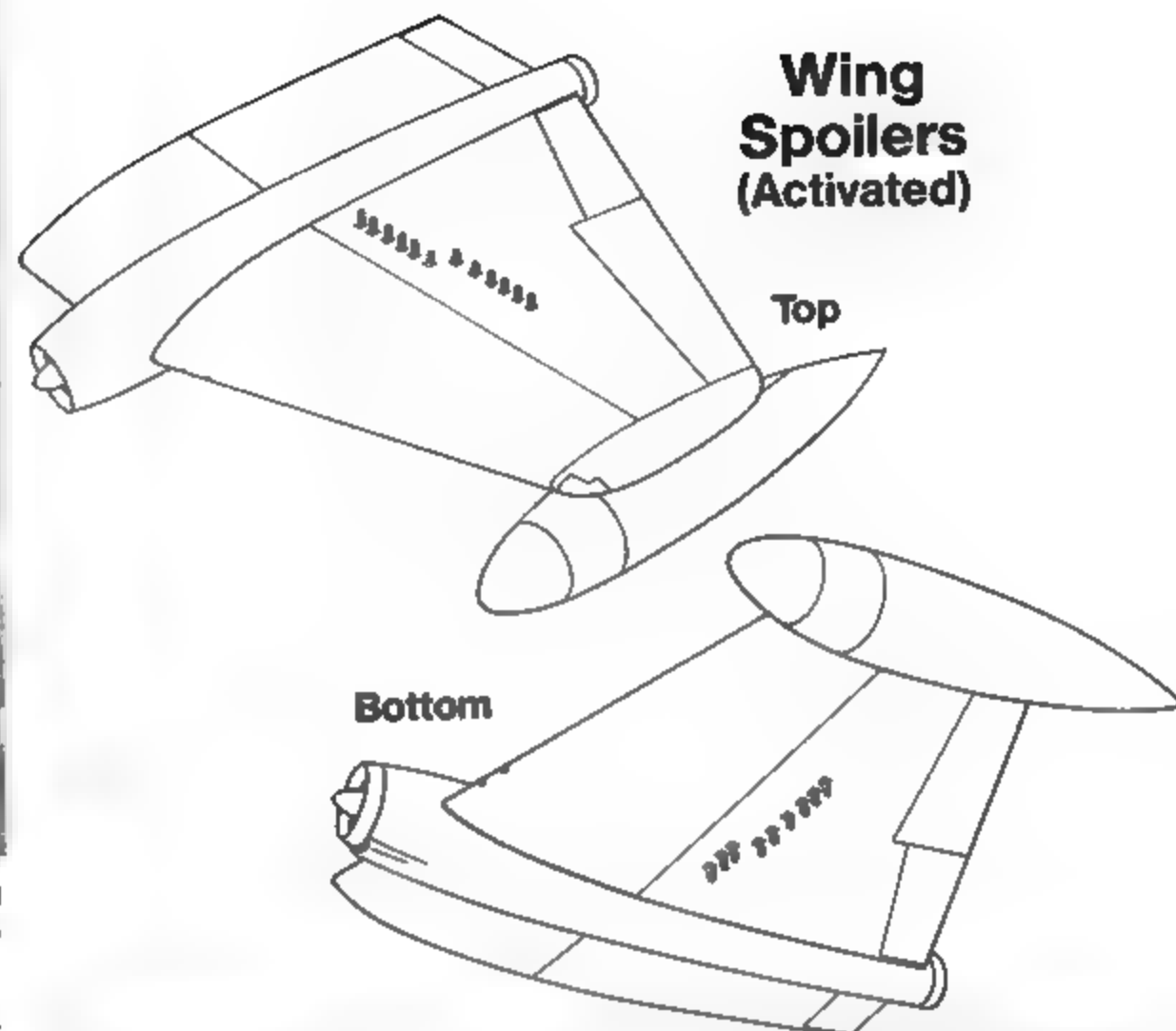
(Below) Tests were conducted with the Canberra to study how well it operated from primitive airfields and under different temperature conditions. The aircraft was found to have good short field take-off characteristics, especially with a limited load. The hard points installed on the under side of the wings can be seen silhouetted against the desert background on this Canberra undergoing tests at Edwards AFB, California. (USAF)





(Above) One of the initial B-57Bs was involved in a 'flying saucer' incident. A close look will show the 'saucer' in the upper right-hand corner. The leading edges of the wings, tip tanks, and anti-glare panel in front of the pilot are painted Flat Black. (USAF)

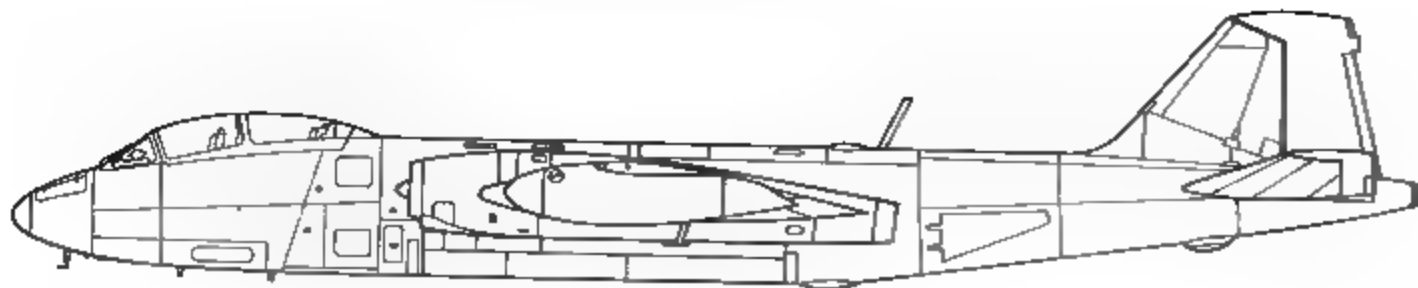
(Below Left) As the B-57B began to enter service crew training was largely handled by the 3510th Combat Crew Training Squadron (CCS) at Randolph AFB, Texas. However, the 345th BG at Langley conducting most of its own training. 3510th CCS aircraft can be identified by the large numbers carried on their wingtip tanks. (USAF Museum via Taylor)



(Below Right) B-26 Invader crews greeted the Canberras with enthusiasm, recognizing the tremendous improvement in performance offered by the B-57. These ground crewmen inspect a newly arrived Canberra in front of B-26s sitting in the background.



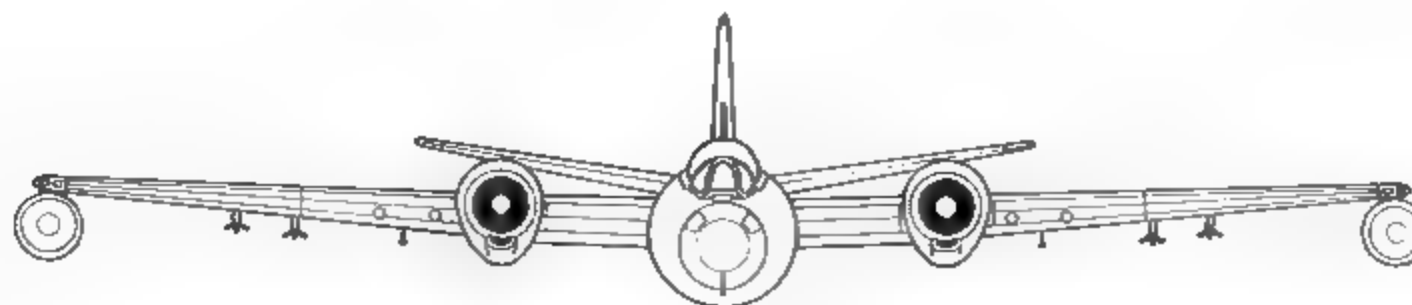
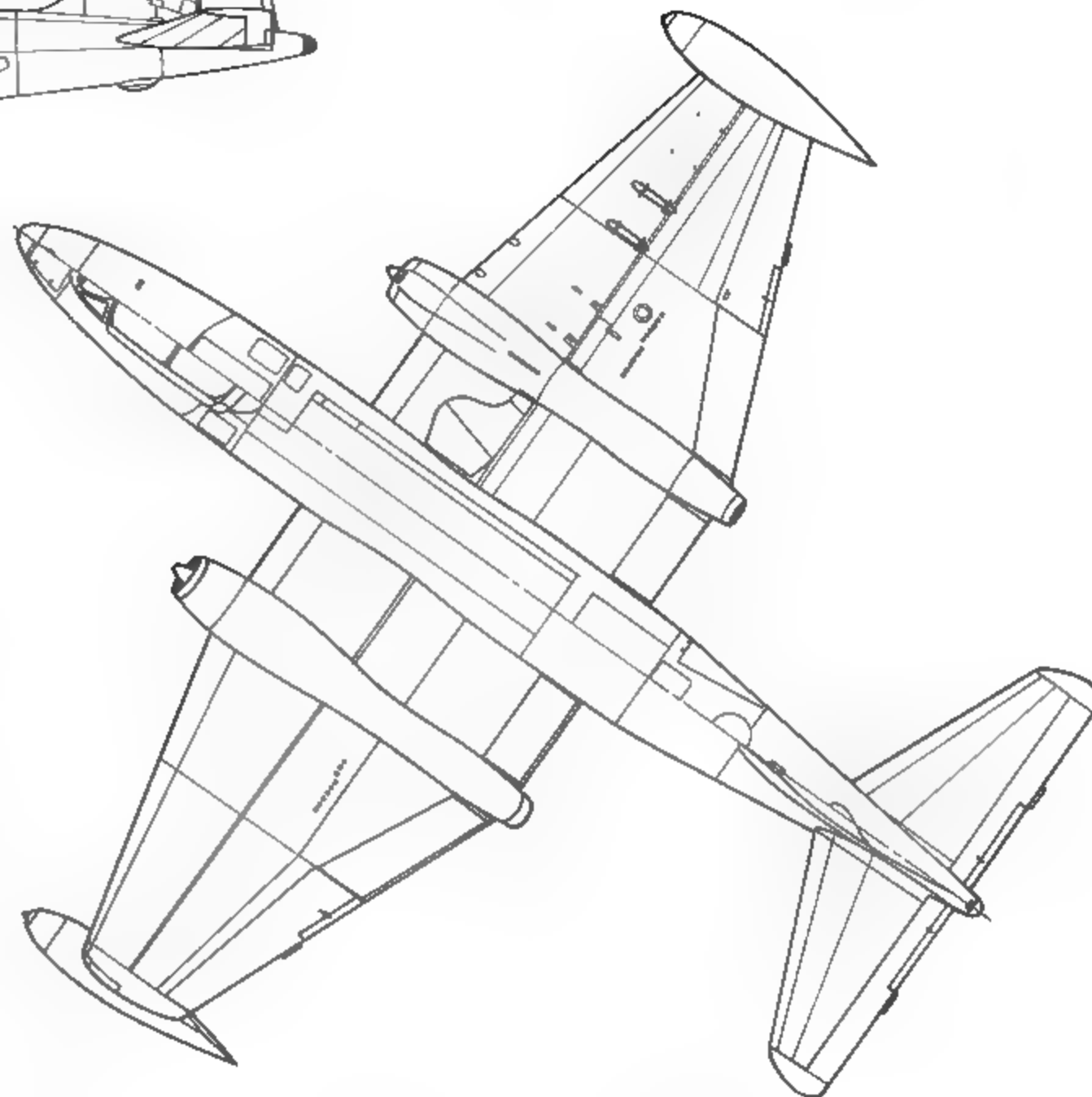




## SPECIFICATIONS

### Martin B-57B Canberra

Wingspan	64 feet
Length	65 feet 6 inches
Height	15 feet 6 inches
Empty Weight	27,091 pounds
Maximum Weight	56,965 pounds
Powerplants	Two J65-W-6 engines 7,220 lb thrust each
Armament	Eight M-3 .50 caliber machine guns, or four M-39 20mm cannon
Performance	
Maximum Speed	513 kts
Service ceiling	40,100 feet
Range	514 nautical miles
Crew	Two



# Into Service

The first unit to receive the B-57B Canberra was the 345th Bomb Group (Tactical) ■ Langley AFB, Virginia, which had earlier received a few RB-57As for familiarization purposes. The initial B-57Bs began arriving in early 1955 with the 345th Group gradually building to strength as additional aircraft became available. However, the 461st Bomb Group (Tactical) was the first unit to be fully equipped with the Canberra. Originally based at Hill AFB in Ogden, Utah, the 461st later moved to Blytheville AFB, Arkansas during 1955 and 1956. As part of the Air Force program to increase the number of Groups operating the Canberra the 38th Bomb Group (Tactical) was activated in Europe at Laon, France on B-26 Invaders until enough Canberras were available to equip its three squadrons. In the Far East, the 3rd Bomb Group (Tactical) traded its aging B-26 Invaders for the new jet becoming fully operational by 1957.

Introduction of the Canberra required training facilities for aircrews and the 3510th Combat Crew Training Wing (CCTW) at Randolph AFB, Texas was ordered to set up a transition school to train the large number of pilots needed for the expansion. Pilots from the 3rd, 38th, and 461st BGs were sent to this school, however the 345th BG did its own training. When training was completed the crews ferried factory-fresh ships back to their assigned units while a new class of pilots arrived to begin the course. During the ferry flights extra fuel tanks were fitted into the bomb bay, and while the flights to Europe were not too much of a problem, the ferry flights across the Pacific stretched the endurance of the B-57B to its fullest, however, only one Canberra was lost due to fuel shortage. Fortunately both crewmen were rescued.

As Canberra units began to reach operational status exercises were conducted to see how the new aircraft would fare under combat conditions. Exercise Sagebrush was conducted in November of 1955 involving the 461st BG and the 363rd TRW. The Canberra performed well, demonstrating the potential power of a jet strike force. Following this exercise the 461st participated in a 1956 goodwill tour of several Latin and South American countries, and then deployed to Europe to participate in Exercise Counterpunch. During Counterpunch the 461st BG served as part of the Mobile Charlie force along with the 38th BG at Laon.

Unfortunately, this early period was marred by a number of fatal accidents. The most common accident scenario was a loss of control during high speed low level passes when, without warning the aircraft would suddenly pitch into the ground. The problem seemed to be with a runaway trim, however this was never positively identified. Crashes began to occur with such regularity that tactical B-57Bs were grounded a number of times, once for nearly four months. After nearly a dozen different *fixes* the problem disappeared and no further aircraft were lost in this manner.

Ironically, just as the Canberra was proving its mettle, plans were being made to phase it out of Air Force inventory. In early 1958 the 38th BG began ferrying their Canberras back to the US from Europe, and in April the 461st BG also began deactivation procedures at Blytheville AFB. Plans for phasing out the Canberra were halted when Lebanon erupted in disorder. As part of ■ show of force, the 345th BG deployed a contingent of B-57Bs as part of the Composite Air Strike Force 'Bravo' to Turkey in support of Army and Marine Corps troops that had landed in Lebanon. The B-57s, however, did not see action and after three months were returned to Langley AFB.

The 345th was sent to Okinawa when tensions heated to near hostilities in the Formosa Straits during the summer of 1958. At least a dozen Canberras were flown to Okinawa in a show of force, even though the 3rd BG with a full complement of B-57s was already based in Japan. However, since the 3rd BG specialized in the delivery of nuclear ordnance and



(Above) The first unit to receive the B-57B was the 345th Bomb Group stationed at Langley AFB in Virginia. The 345th BG, known as the 'Air Apaches', received notoriety during World War II while operating B-25 Mitchells with deadly effect against the Japanese. The Group's Indianhead emblem is carried on the tail. (USAF)

(Below) The first unit to become fully equipped with the B-57B was the 461st Bomb Group, stationed at Hill AFB, Utah and later moved to Blytheville AFB, Arkansas. The markings were Yellow, White, or Red stripes radiating from a circle on the tail. The top stripe and circle were the same color. (USAF)



was committed to strategic targets in North Korea, China, and the Soviet Union. As a result, Pentagon officials believed that the 3rd BG could not be spared for the Formosa crisis. Throughout the crisis the 3rd BG continued to fly standard operations while the 345th BG patrolled out of Okinawa. After the crisis the 345th BG returned to the US where it was disbanded.

Following the deactivation of the 345th BG, the 3rd BG was the only tactical Canberra bomb group in the USAF. However, since Japanese restrictions against maintaining atomic devices in that country forced the 3rd BG to rotate a portion of its aircraft from Japan to Kunsan AB in Korea, where they were maintained on alert armed with nuclear weapons. These aircraft could be airborne within fifteen minutes, and were targeted to strategic points in North Korea, China, and the Soviet Union as part of a *quick strike* force in case of war. This assignment lasted six years, from August of 1958 until April of 1964, when the nuclear strike role was phased out. The Canberras were returned to their home base at Yakota, Japan and plans were made to deactivate the group. However, events in South Vietnam soon put a hold to these deactivation plans and thrust the Canberra into a war which would further test its merits and extend its service life by another eight years.



(Above Right) The sleek, new Canberra bomber was a popular attraction at airshows especially when it carried a gleaming coat of Black paint. This aircraft from the 461st Bomb Group is being displayed with an assortment of ordnance under its wing. (Bishop)

(Below Left) In support of NATO forces in Europe the Air Force reactivated the 38th Bomb Group, equipping it with B-57Bs. Based at Laon in France the unit's squadrons were easily identified by the artwork on their wingtip tanks: a helmet (71st), an eagle (822nd), and a dragon (405th) seen on this Canberra. (Bishop)

(Below Right) The unusual markings carried on the wingtip tank of this 461st Bomb Group B-57B indicates that it may be the personal aircraft of the group commander. (Menard via Bishop)







(Above Left) Canberras of the 71st Bomb Squadron of the 38th Bomb Group at Lecon, France. The closest aircraft lacks the knight's helmet which was normally painted on the tip tanks of 71st BS Canberras. The rudders ■ these B-57Bs are painted Red with the unit insignia located just forward of the rudder in a White square.(Bishop)

(Above Right) In the Far East the 3rd Bomb Group traded its Invaders for the new Canberra. Captain Ellis Bruch stands in front of a B-57C trainer from the 8th Bomb Squadron, the 'Liberty Bell' squadron, which traced its lineage back to World War One.

(Below Left) A flight of 'Air Apaches' fly along the East Coast on a training mission. This unit deployed overseas twice in support of US forces during 1958, once during the Lebanese crisis in July and again ■ August and September when hostilities broke out in the Taiwan Straits. (USAF)

(Below Right) When the Gloss Black paint on the Canberras delivered ■ the 3rd BG did not hold up well, the Group decided to switch to overall natural metal. This change ■ color scheme corresponded with the strategic nuclear bombardment mission ■ the 3rd BG. (Mikesh)



# RB-57D EB-57D

During the early 1950s the Air Force examined the possibility of procuring a high altitude reconnaissance aircraft to operate over Russia and China. This would eventually result in the Lockheed U-2, but while work was progressing on this amazingly advanced reconnaissance design, the Air Force sought an interim aircraft to fill the high altitude reconnaissance requirement. Fairchild and Bell had both submitted completely new designs which were eventually discarded, the Fairchild design due to limited capabilities, and the Bell proposal because the U-2 beat it into the air by some two months. The B-57's high altitude performance, its large fuselage and payload capacity, made the Canberra an obvious choice as an interim reconnaissance aircraft until the Lockheed U-2 could become operational.

Based on these conclusions, the Air Force approached Martin in June of 1954 with a proposal under the highly classified 'Black Knight' program to build six aircraft. Under the Martin in-house designation Model 294, these aircraft featured a standard B-57B fuselage, but were powered by more powerful J57-P-9 turbojets. The most significant change in the Canberra design, however, was a new wing which was increased in span from 64 feet to 106 feet. This reconnaissance variant of the Canberra received the official USAF designation B-57D in September of 1954, but was subsequently changed to RB-57D during the following April to better reflect its reconnaissance role.

Although the Air Force initially ordered only six aircraft, this was later amended to twenty aircraft as the need for and potential of the new variant became apparent. These aircraft were procured in four groups with minor differences.

**Group A - RB-57D (Model 294)** Single seat, equipped with two K-38 and two KC-1 split vertical camera's, no in-flight refueling capability. Six (6) procured.

**Group B - RB-57D (Model 744)** Similar to Group A aircraft but with in-flight refueling capabilities. Seven (7) procured.

**Group C - RB-57D-2 (Model 796)** Crew of two, equipped for electronic intelligence/signal intelligence (ELINT/SIGNET), in-flight refueling capabilities. Six (6) procured.

**Group D - RB-57D-1 (Model 796)** Single seat, equipped with AN/APQ-56 high resolution, side-looking radar for day or night radar mapping reconnaissance, in-flight refueling capabilities. One (1) procured.

In the rush to get the new aircraft operational only a limited flight test program was carried out. Begun in late 1955 these tests found that the immense wing caused several problems. The wing spar and selected panels required additional strengthening, and the thin surface cover necessitated careful treatment, since a dropped tool could easily puncture it. The honeycombed wing structure suffered from water seepage, wing stress, and the dissolution of its bonding agent by de-icing fluids. Despite these problems the new aircraft was quickly ready for acceptance by the Air Force.

In March of 1956, SAC took delivery of the first aircraft under Project 'Black Knight', assigning them to the 4080th Strategic Reconnaissance Wing (SRW) in April. Within the 4080th SRW the RB-57D's were used to equip the 4025th Strategic Reconnaissance Squadron (SRS). Training began during the spring using an RB-57C, and by late summer and early fall the 4080th SRW sent detachments to operate out of Yokota AB, Japan, and Emerson AFB, Alaska. While the detachment at Emerson soon returned to the US, the six planes sent to Yokota remained for nearly a year under OPERATION SEA LION. Many of the missions on which the RB-57D's were employed dealt with Electronic Intelligence and Signal Intelligence (ELINT/SIGNET), or the collection of air samples. Most of the missions centered on targets in China and the Soviet Union, particularly nuclear test sites.

The 4025th SRS operated RB-57Ds until mid-1959, providing detachments for sampling US nuclear tests at Eniwetok Atoll and helping to train Nationalist Chinese crews on the RB-57D. A four plane detachment of the 4025th operated out of Rhine Main, Germany, under OPERATION BORDERTOWN carrying out ELINT/SIGNET and air sampling missions. When the 4025th SRS was deactivated in mid-1959 the squadron's aircraft were used to form the 7407th Support Squadron (SS) which was assigned directly to US Air Force Europe (USAFE) command as part of Project 'Big Safari'. Two additional aircraft were received, including the single RB-57D-1 built, which was specially modified to carry high resolution side-looking radar. Due to the length of missions over Russia RB-57D Canberras were all (except for Group A aircraft) equipped with autopilot, folding rudder pedals (to allow the pilot to stretch his legs), and in-flight refueling capabilities. These missions continued until 1964 when structural problems forced retirement of the aircraft.



(Above) The B-57D wing was over forty feet longer than the span of the bomber variant. The increased wing area allowed the Canberra to reach altitudes never envisioned in the original design. (USAF)

Aside from the 4025th SRS, the RB-57D also saw service with a host of other specialized units. NASA acquired a few of these Canberras for high altitude tests and mapping, and at least six RB-57Ds were assigned to the 4677th Defense Systems Evaluation Squadron (DSES) at Hill AFB where five DSES aircraft were used to obtain air samples during the last American above-ground nuclear test. The 4677th Radar Evaluation Squadron (RES) received four aircraft for use with its role in radar calibration and evaluation. Additional aircraft were also operated by the 1211 Test Squadron (Sampling) of the Air Weather Service, at Kirtland AFB in New Mexico. These Canberras were redesignated WB-57Ds, in keeping with their weather work. This unit later changed its name to the 58th Weather Reconnaissance Squadron (WRS).

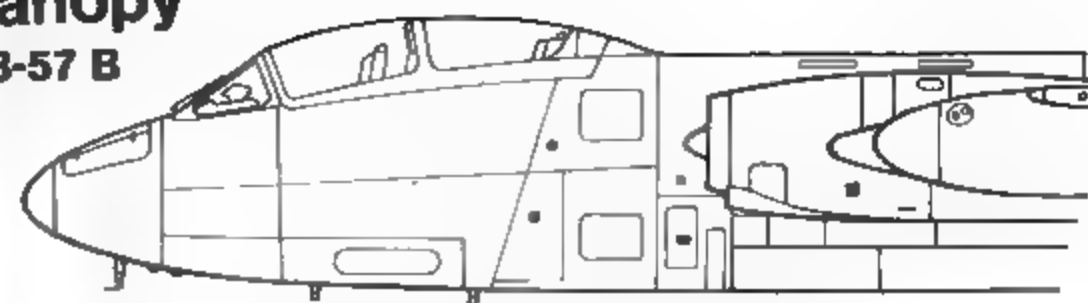
Throughout the RB-57D program, stress on the wing spar resulting from the enlarged wing remained a formidable problem. By 1959, SAC had retired some aircraft to the storage facility at Davis-Monthan AFB in Arizona because of this problem. During 1963 the wing stress problem became so critical that the decision was made to ground all remaining RB-57Ds. However, since USAF still needed an aircraft with both the altitude and payload capacity of the RB-57D the Air Force contracted with Martin during 1966 to rebuild the wings of its RB-57Ds with a guaranteed service life of 3,000 hours. A number of previously stored aircraft were shipped to the Martin plant where the work was done. These aircraft were updated with electronic countermeasure gear (ECM), receiving the designation EB-57D, and were used to test and evaluate a whole series of Air Force systems until they were finally retired in 1970.

Although the RB-57D could not match the high performance of the Lockheed U-2, it possessed a greater payload capacity enabling it to carry out assignments which the U-2 could not perform. The two seat configuration of later RB-57Ds allowed the stress of long flights to be shared, increasing the efficiency and effectiveness of the crew. Before the structural integrity of the wing ended the RB-57D's operational career, the aircraft compiled an enviable record, providing valuable reconnaissance and ELINT/SIGNET information. And its replacement would eventually be an improved version of the RB-57D design, rising from the desert boneyard storage facility at Davis-Monthan AFB like the mythical Phoenix.

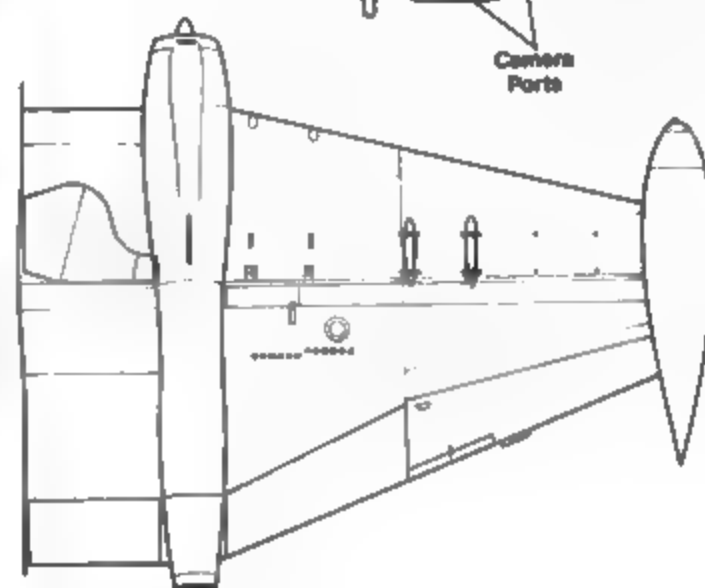
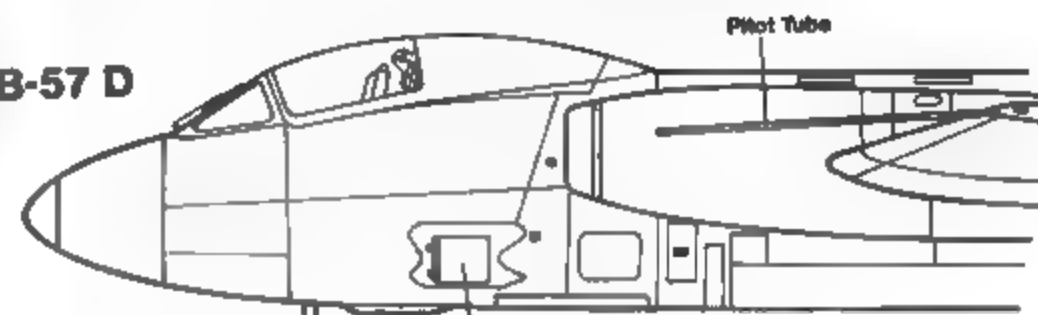


## Canopy

### B-57 B

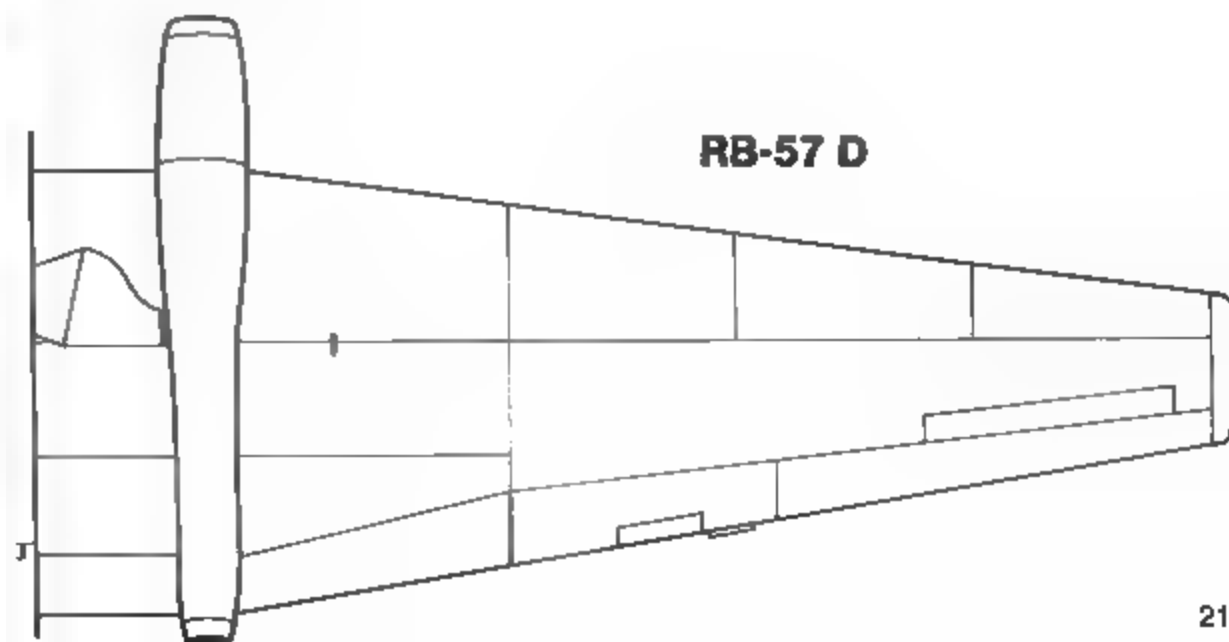


### RB-57 D



## Wing

### B-57 B



### RB-57 D

(Above and Below) This unusual White over Black RB-57D took part in OPERATION BORDERTOWN during early 1959 involving a series of electronic intelligence (ELINT/SIGNET) gathering missions along the Iron Curtain. In addition, the aircraft was also used to gather air samples. (General Dynamics/Thorton)

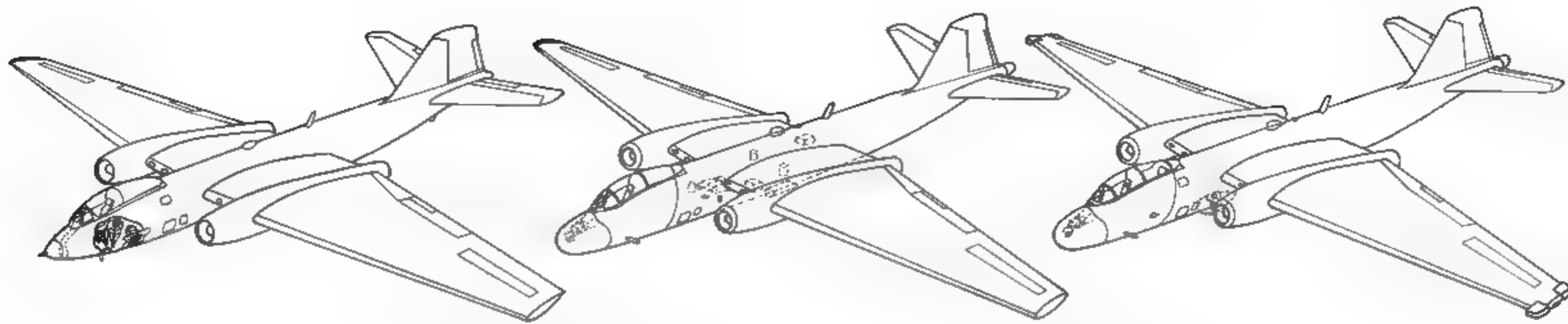




## RB-57 D Group B

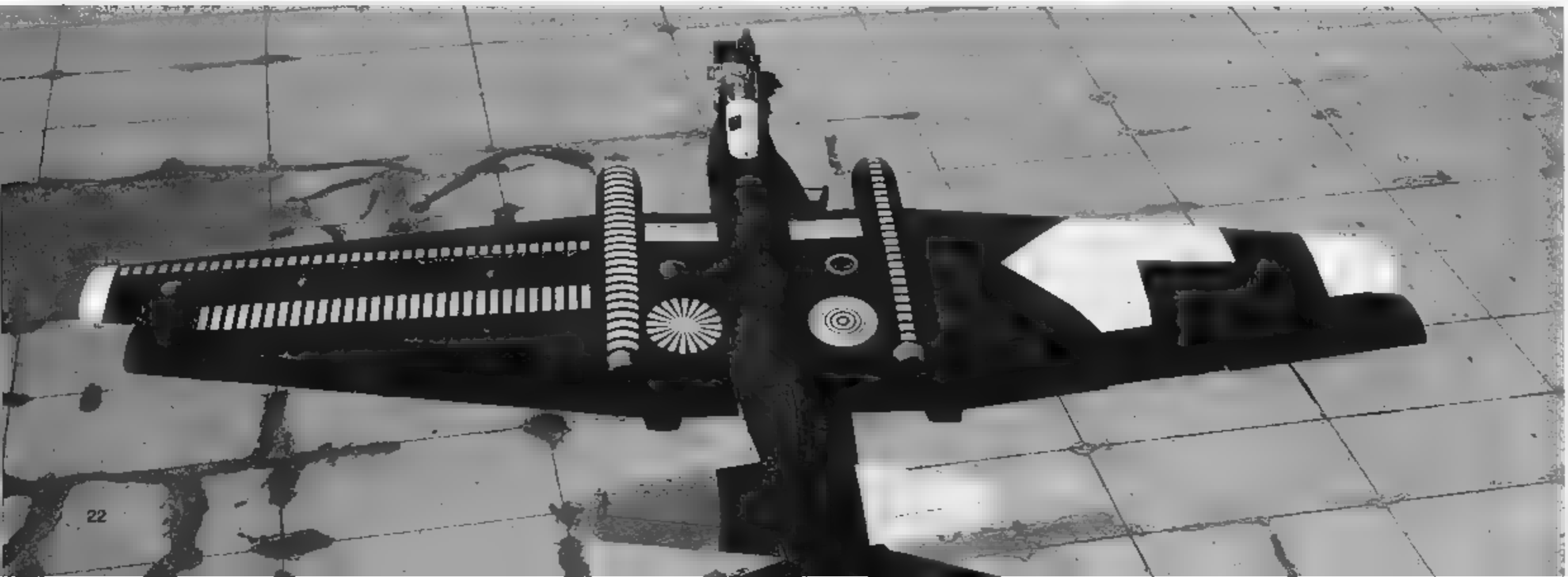
## RB-57D-1 Group D

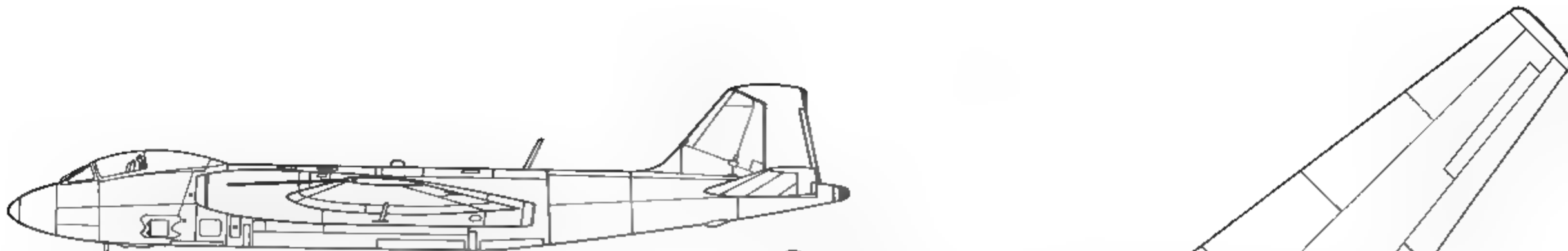
## RB-57D-2 Group C



(Below) This RB-57D carried one of the most extraordinary paint schemes of any B-57 and perhaps any aircraft. It was used to test the quality of camera lenses and film emulsions during Project Aerospace Photographic Reconnaissance Experiments (APRE). During these

experiments the aircraft would fly under a balloon which had a camera mounted beneath it. As the Canberra passed below it was photographed and the photos were then compared to others taken from the balloon. The testing was done at Wright Patterson AFB, Ohio. (Anderton)

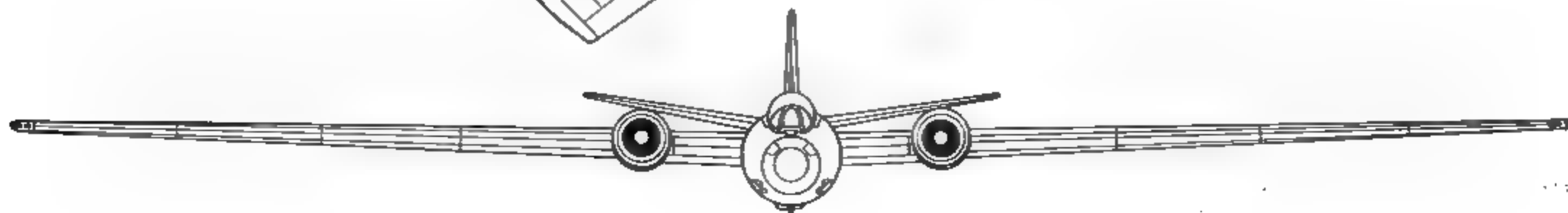
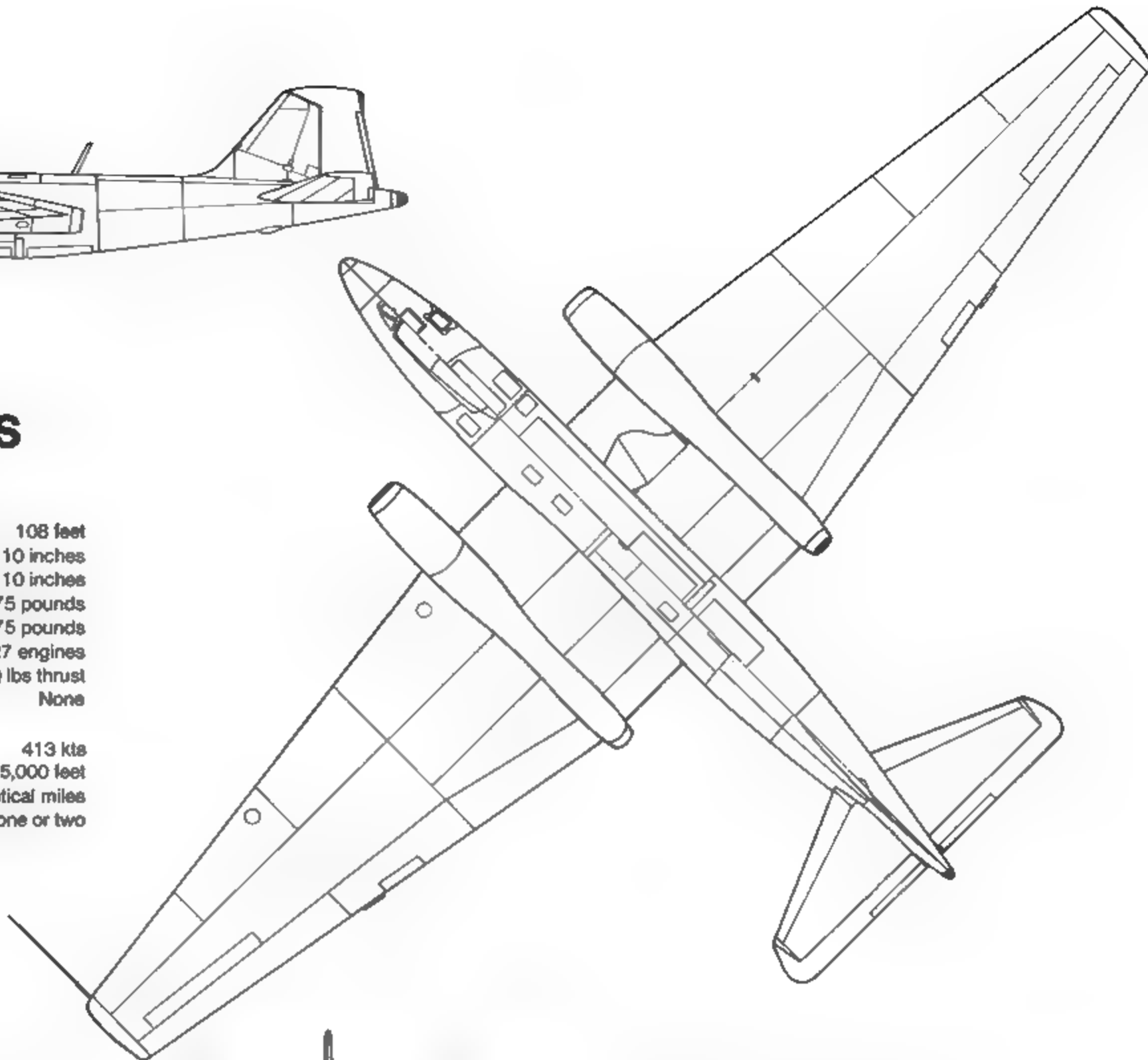




## SPECIFICATIONS

### RB-57D CANBERRA

Wingspan	108 feet
Length	64 feet 10 inches
Height	14 feet 10 inches
Empty Weight	27,275 pounds
Maximum Weight	54,075 pounds
Powerplants	Two J57-P-27 engines 10,500 lbs thrust
Armament	None
Performance	
Maximum Speed	413 kts
Service ceiling	55,000 feet
Range	1,354 nautical miles
Crew	one or two



# B-57E

The B-57E Canberra was equipped specifically for use as a target towing aircraft, and was basically a B-57C with the combat equipment deleted. In place of the combat gear the B-57E had an operator's station installed in the rear seat, a full-time power rudder, a yaw damper, four 'two-reels' in the bomb bay, and two externally mounted tow canisters in the tail cone.

The size and configuration of the towing unit did not allow the bomb bay door to rotate to a fully open position, which necessitated lowering the bomb bay unit completely during servicing or replacement of the towing cables. The tow reels were armor plated to protect the fuselage or fuel tanks from a cable end which might begin whipping around in the bay. Each of the reels weighed some 1,500 pounds, and were mounted so their centerlines ran parallel with the fuselage.

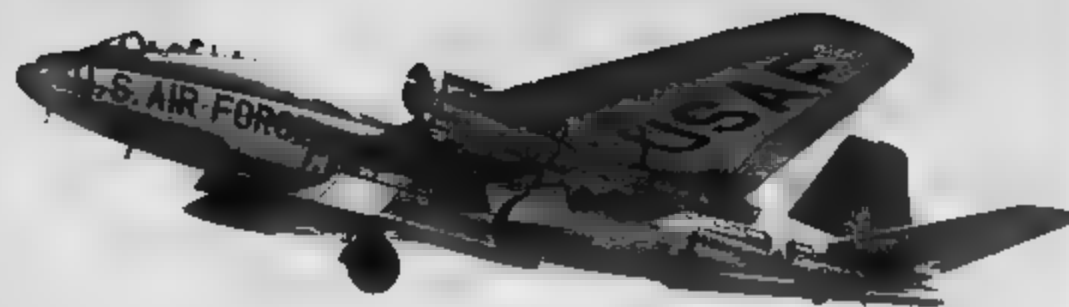
The tow reels were controlled by the tow target operator who sat behind the pilot. When the aircraft reached its designated altitude and area of operation the operator opened a valve which allowed air to flow into the reel mechanism moving the reel a few turns which pulled the target out of one of the tail mounted canisters. This was a delicate maneuver, if the reel speed was too slow or too fast the target could break off or get tangled. Once unfurled the 9 by 45 foot target and its cable imposed a tremendous drag on the aircraft. Towing usually required full, or nearly-full engine power during the mission until enough fuel had been burned off to permit a power reduction. Towing missions usually lasted two hours, during which time only two targets were normally used, consequently, to save weight two of the 'two-reel' mechanisms were eventually removed from many aircraft.

During target towing missions a T-33 chase plane usually accompanied the B-57E to spot hits on the target. The chase plane would drop back periodically to look at the target and check scores of the attacking aircraft. Once the target was no longer useful it was reeled to within a few feet of the tail where electronically-operated hydraulic cutters cut the cable, releasing the target.

While the banner target was the type most often used with the B-57E, a frangible radar-reflective target was introduced during the late 1950s. Because of its weight the banner could not be launched above 30,000 feet due to inadequate air pressure to operate the turbine drive on the towing mechanism. When the new Delmar target, made of styrofoam, became available, a lighter tow cable was substituted which resulted in a significant weight savings allowing the B-57E to operate above 40,000 feet, and a wider range of weapons to be used by the participating aircraft.

While the B-57E was designed primarily for target towing, it would be quickly and easily converted back to combat configuration. After heavy losses suffered in two ground explosions in Vietnam, twelve B-57Es were withdrawn from target towing duties and reconfigured by Martin for combat operations. Seven of these former target towing aircraft eventually saw service over Indochina as bombers.

(Right) This B-57E is believed to have been used to transport high ranking Air Force officers on special administrative missions out of Andrews AFB, Washington. The paint scheme is overall White with Black nacelles with Red trim. This aircraft was later reconfigured for combat operations but did not see duty in Vietnam. (USAF)



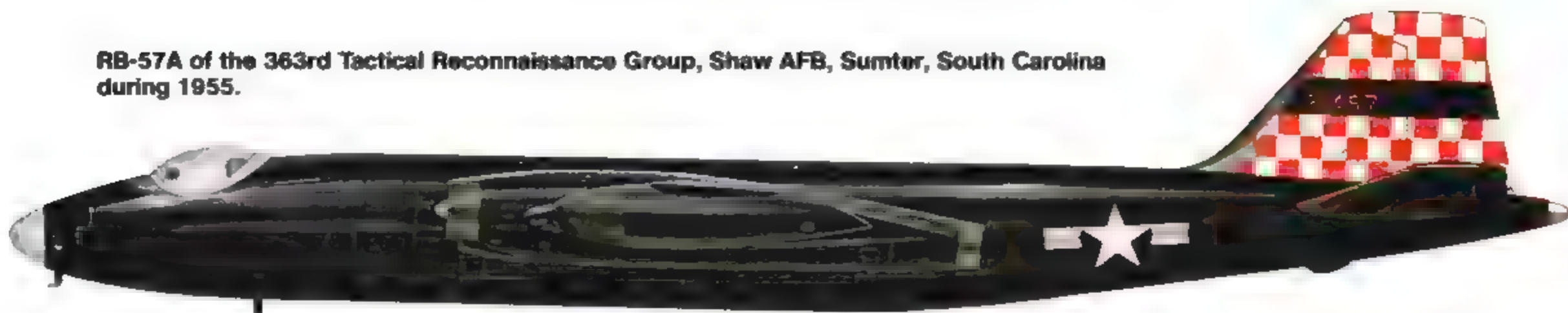
(Above) The first B-57E takes to the air. This variant of the Canberra was specifically designed as a target towing aircraft, but could quickly and easily be converted back to combat configuration. A number of B-57Es were converted to bombers during the Vietnam War following the losses at Bien Hoa. (USAF)

(Below) Most B-57Es used as target tugs were finished with brilliant Orange upper surfaces over Natural Metal lower surfaces, making them among the most colorful of all Canberras. This is the second production aircraft. (USAF)





RB-57A of the 363rd Tactical Reconnaissance Group, Shaw AFB, Sumter, South Carolina during 1955.



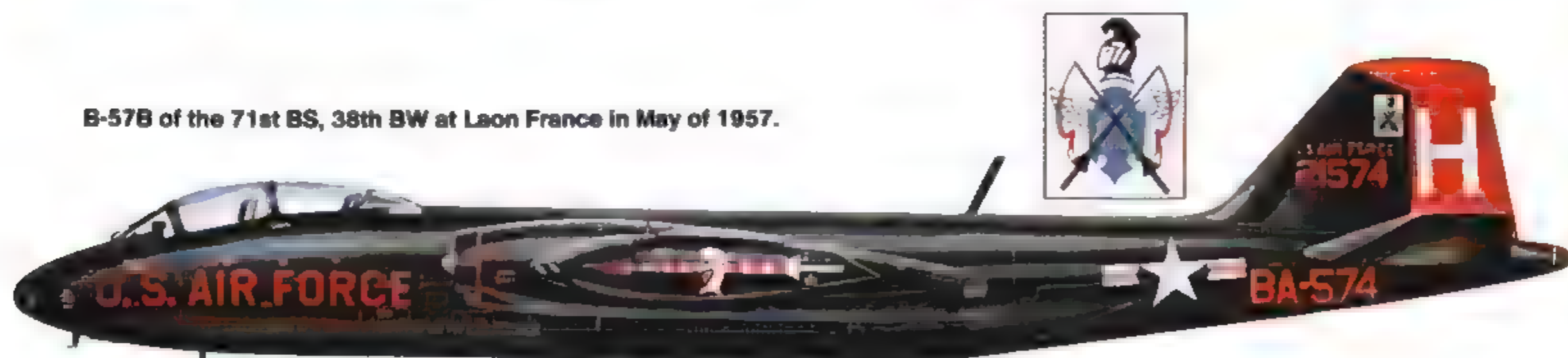
RB-57A of the 30th TRS, 66th TRW, Sembach, Germany during 1956.



RB-57A of the 1st TRS, 10th TRW in Germany during 1957.



B-57B of the 71st BS, 38th BW at Leon France in May of 1957.



B-57E of the 3rd Tow Target Squadron at George AFB, California during 1956.



Commander's B-57B of the 461st Bomb Group at HWM AFB, Utah.



RB-57D (Group A) of the Nationalist Chinese Air Force at Taoyuan AB, Taiwan during 1959.



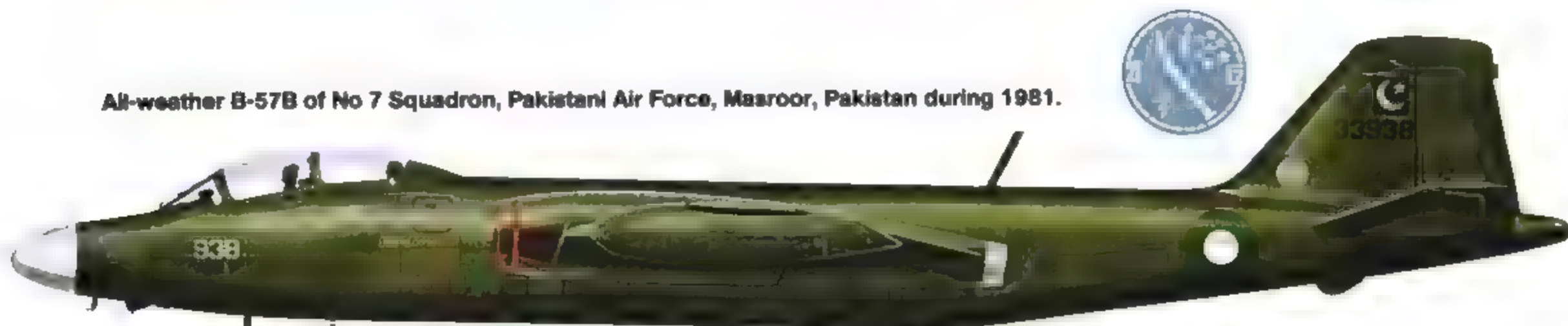
B-57B of the Vietnamese Air Force at Da Nang in October of 1965.



RB-57F (redesignated WB-57F) of the 58th WRS, Military Transport Service (MATS) at Kirtland AFB during 1969.



All-weather B-57B of No 7 Squadron, Pakistani Air Force, Masroor, Pakistan during 1981.





# RB-57E

During the early 1960s, as US involvement in Vietnam began to escalate American advisors poured into the Southeast Asian country to support the faltering pro-Western rule of Ngo Diem. One problem which handicapped both the South Vietnamese and their US advisors was a lack of accurate intelligence on the bases, strength, and movement of the Viet Cong. While the US Air Force had developed a number of new reconnaissance systems which it considered capable of eliminating this deficiency, it had no aircraft capable of carrying the new equipment. The Air Force selected two target towing B-57Es for modification as reconnaissance platforms to test the new systems under combat conditions in Vietnam. The Canberra had been chosen because USAF officials believed the aircraft's speed, maneuverability, and reliability would enable it to survive the primitive conditions and hostile fire which would be encountered in Vietnam.

A contract for the necessary modifications was awarded to General Dynamics in Fort Worth, Texas. The initial modifications involved a complete redesign of the nose section to carry a 36 inch KA-1 forward oblique camera and a KA-56 low panoramic camera. The bomb bay was reconfigured to carry additional cameras including a KA-1 vertical camera, a K-477 split vertical day/night camera, an infrared scanner, and a KA-1 left oblique camera. So much was expected of these systems and so urgent was the operational need for intelligence, that when the initial two aircraft, designated RB-57Es, were ferried to Vietnam they were immediately pressed into service using the ferry pilots from the 6091st Reconnaissance Squadron in Japan to fly missions out of Tan Son Nhut until permanent pilots were available. The RB-57E flew its first mission on 7 May 1963, the day after their arrival, with another mission being carried out three days later. The RB-57E made photo runs on a variety of suspected Viet Cong targets, uncovered storage facilities, a small arms factory, a base camp, and a training center. These targets could not have been discovered by normal aerial observation, underscoring the importance of the new reconnaissance system.

## Patricia Lynn

Impressed with the results of these initial missions, the 2nd Air Division at Tan Son Nhut quickly had the two RB-57Es flying as many missions as possible under the code name 'Patricia Lynn'. Replacement crews soon arrived from the US to relieve the ferry pilots, and a steady flow of intelligence material kept coming in on Viet Cong facilities and troop movements. The two planes were assigned to the 33rd Tactical Group under the designation Detachment 1. Three more aircraft were eventually received, bringing the detachment up to a maximum strength of five RB-57Es. In August of 1965 the RB-57Es were assigned to the 6250th Combat Support Group, but by the following summer the unit was reassigned to the 460th Tactical Reconnaissance Wing.

During their use in Vietnam the RB-57Es flew thousands of sorties over North and South Vietnam, Laos, and Cambodia, losing only two aircraft; one was downed in August of 1965, and another was downed in October of 1968, both to ground fire, with the safe return of both crews. Throughout their service, the RB-57E was constantly being updated as new equipment was developed. One of the more interesting updates was implemented under the code named 'Compass Eagle' in 1968 using an infrared scanner and an inflight display screen which eliminated the need for photographs and their subsequent development. Using 'Compass Eagle' the crew could immediately spot suspicious activity and radio back for air or artillery strikes. 'Compass Eagle' equipped Canberras proved extremely helpful to US Navy 'Game Warden' forces operating along the vast network of rivers and waterways south of Saigon, enabling them to pinpoint Viet Cong supply sampans. Throughout these operations, RB-57Es provided invaluable aid to the Navy's PBRs and HAL-3 gunships which were

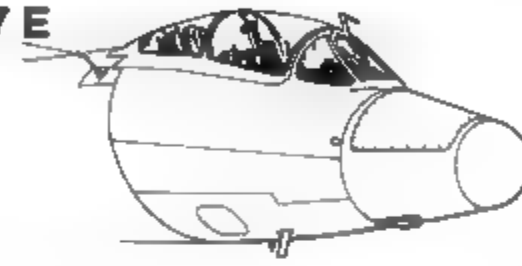


(Above) This RB-57E was the first Patricia Lynn aircraft to be destroyed by enemy action. It was hit by ground fire in August of 1965 and crashed just short of Tan Son Nhut airfield outside of Saigon. Fortunately both crewmen ejected and were safely rescued by friendly forces. (USAF)

B-57 B



RB-57 E



engaged nightly in missions to cut enemy supply lines in the area.\*

Another interesting modification occurred during the late 1960s when high-acuity, high resolution KA-82 and KA-83 cameras, with focal lengths of 1 and 24 inches respectively, were mounted in the RB-57Es. These cameras had been originally designed for use in spy satellites and their use in the 'Patricia Lynn' Canberras was the first time such a system was used for tactical reconnaissance. The film required special processing, but the resulting photos revealed a great deal of information which previous systems would have missed, and far outweighed the additional expense and effort.

Employing the latest reconnaissance technology, 'Patricia Lynn' crews surveyed the length and breadth of the war zone and adjacent areas. The five RB-57Es generated more daily targets than did the two squadrons of RF-4C Phantom IIs and one squadron of RF-101 Voodoos that it shared reconnaissance duties with. Eventually, the Canberras were credited with over 94% of the battlefield intelligence generated by aircraft. For their outstanding work during the Cambodian invasion during the spring of 1970 the detachment received a special citation from MACV in Saigon. As Vietnamization was implemented RB-57Es continued to fly missions until mid-1971 when activities wound down to the point where the aircraft were returned to the US, ending their service under the hot Arizona sun at the Davis-Monthan AFB aircraft graveyard.

\*For additional information on the Navy's River operations see RIVERINE published by Squadron Signal.

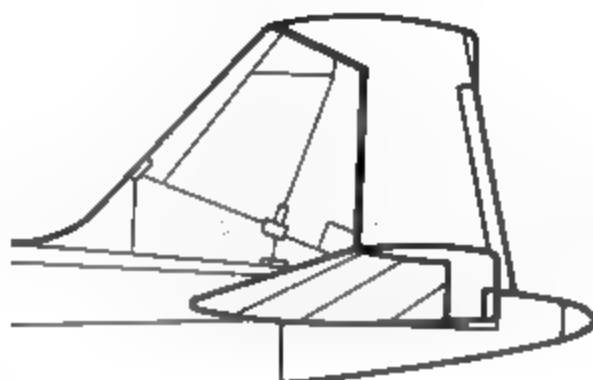
(Below) Eventually all Patricia Lynn aircraft were painted Flat Black, causing the crews much concern, who believed the paint scheme brought undue attention to them resulting in more than their share of enemy fire during a mission. This aircraft (0-54264) parked in a revetment at Tan Son Nhut, was the fifth B-57E converted under the program. (USAF)



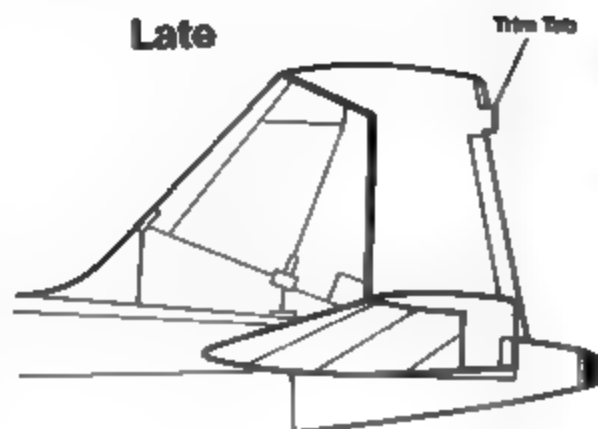


# Canberra Rudder Trim

Early



Late



(Below) Throughout the war RB-57Es were in constant demand, providing the bulk of the battlefield intelligence for US commanders. This aircraft waits to take off as a C-123 comes in for a landing. Patricia Lynn operations were terminated in mid-1971. (USAF)



(Above) This Patricia Lynn aircraft (0-54264) during a rocket attack on Tan Son Nhut the RB-57E was hit by hundreds of pieces of shrapnel and had to be sent to Japan for repairs. This aircraft later became the second and last RB-57E lost in enemy fire when the left engine was hit and caught fire on a 25 October 1968 mission. Both crewmen ejected safely and were rescued. (USAF)



# RB-57F

Of all the Martin built Canberra variants used by the Air Force, the RB-57F series was the one which bore the least resemblance to the English Electric Canberra. The RB-57F evolved from the earlier RB-57D which featured an extensively redesigned wing for high altitude reconnaissance work. Structural problems with the wing spar resulted in the withdrawal of the RB-57Ds, forcing the Air Force and several other government agencies to urgently look for a replacement. Since General Dynamics had been heavily involved in repairing and updating the RB-57D during its service life, the company was approached by the Air Force about modernizing the B-57 again. After exchanges of ideas and requirements, General Dynamics was awarded a study contract in March of 1962 to see if it was feasible to use the RB-57D as the basis of an updated B-57 with improved performance, maintainability, and service life. Under the direction of Vincent Dolson, General Dynamics's head of special projects for the Fort Worth division, a group of engineers began studying options which might prove feasible. Dolson had previously worked on a number of RB-57Ds which had been modified for special programs which not only familiarized him with the aircraft's characteristics, but also with the limitations of the design.

Throughout the spring and summer of 1962, Dolson's team labored over the project. One of the major problems which had to be solved was how to expand the payload capacity of the new aircraft to carry the newer, more sophisticated equipment envisioned for the updated Canberra. At the end of September the design study, which incorporated the increased payload capacity, was presented to the Air Force representatives, who after review issued an order on 2 October 1962 for construction of two examples of the new aircraft under the designation RB-57F.

Because of the urgency of procuring a replacement for the RB-57D, the Air Force used every measure to get the aircraft into production as soon as possible. To cut red tape, the whole program was placed under the auspices of the 'Big Safari' procurement policy, eliminating much of the interference from government agencies insuring that the project would progress as rapidly as possible. Construction began on 26 November 1962 and was greatly aided by utilizing equipment left over from B-58 production, which helped to cut both expenses and time. The end result was that on 16 May 1963, only eight and one half months after the contract was signed, the first RB-57F was rolled out and on 23 June the aircraft made its first flight.

The Canberra that took to the air was unlike any previous Canberra variant. The standard B-57 had a wingspan of 64 feet and the RB-57D a wingspan of 106 feet, while the wingspan of the RB-57F was an incredible 122 feet! Respective wing areas were 960, 1500, and 2000 square feet respectively. Aside from this increase in wingspan and area, a completely redesigned rudder with double the surface was added to compensate for rolling at high altitude and to improve single engine control. General Dynamics used three wing spars to increase the wing's strength and further reinforced the wings structural strength by using a honeycombed skin structure. It was hoped that these measures would alleviate the structural fatigue which had grounded the RB-57D. Power for the RB-57F was supplied by a pair of Pratt and Whitney TF33-P-11A turbofan engines generating over 16,000 pounds of thrust each. This was more than double the power available to the standard J65 powered B-57 (7,200 pounds) and 50% more than that of the J57-P-5 powered RB-57D (10,500 pounds). In addition, a detachable 3,000 pound thrust Pratt and Whitney J60-P-9 turbojet engine could be mounted under each wing. Removable, these engines were normally in place and only removed on missions which called for maximum range. Not equipped with starters, the detachable engines were air started, necessitating their wind-milling to 12% of power while in flight before they would activate. Once activated, they remained idle until an altitude of 32,000 feet was reached, at which point partial throttle control became effective. Above 42,000 feet full throttle control became available. These turbojets at full power added 2,500 feet to the operational altitude of the aircraft.

In order to get the new aircraft into service as quickly as possible flight testing of the first two RB-57Fs commenced immediately. One of the earliest characteristics found during these flight tests was the aircraft's reluctance to land due to its large wing area, ensuring that it would never be able to operate out of small, under-prepared airfields as the B-57B could. Otherwise, the new plane exhibited no serious defects and handled somewhat better than the RB-57D.

While development and testing of the RB-57F progressed, work was being done on the systems which the plane was to carry. One of the most important systems developed, and by far the heaviest, was a new high altitude camera (HTAC) which weighed nearly two tons. Capable of a side-looking range of nearly sixty miles, an excellent photo could be obtained at maximum range, although the clarity improved as range decreased.



(Above) The first B-57F prototype in flight shortly before General Dynamics turned it over to the Air Force. One word can be used to describe the new wing of the RB-57F — IMMENSE! It was nearly twice the size of the standard B-57B wing and provided the RB-57F variant with tremendous lift, allowing it to operate at extremely high altitudes. (USAF)

By late 1963 the test program had been completed to the satisfaction of both General Dynamics and the Air Force and the two prototypes were sent to the 7407th Combat Support Wing at Rhine Main AFB, Germany, to test the surveillance/reconnaissance systems along the Iron Curtain. Since direct overflights of enemy territory were prohibited as a result of the Gary Powers U-2 affair in 1960, the only way to get aerial photographs was to fly just outside a country's border at the highest altitude possible and take side looking photographs, a task for which the RB-57F proved very capable of carrying out. Beginning in late 1963 through January of 1964, the 7407th used these two aircraft to monitor activities in the Soviet Union and various Warsaw Pact nations. In February of 1964 the two planes were transferred to the 58th Weather Reconnaissance Squadron (WRS) at Kirtland AFB, New Mexico.

Having proven the RB-57F in operational service, the Air Force placed an order for nineteen additional aircraft, with most eventually being assigned to the Military Air Transport Service's (MATS) 9th Weather Reconnaissance Wing based at McClelland AFB, California. Within the 9th WRW were two squadrons which operated the RB-57F, the 56th WRS at Yokota AB, Japan and the 58th WRS at Kirtland AFB; the 7407th SS also operated the RB-57F until it eventually became part of the 58th WRS in 1969. While the 9th WRW operated detachments for varying lengths of time from US and allied bases around the world, in general, the 9th WRW concentrated most of its activities in the Pacific area with the 7407th SS working the European sector.

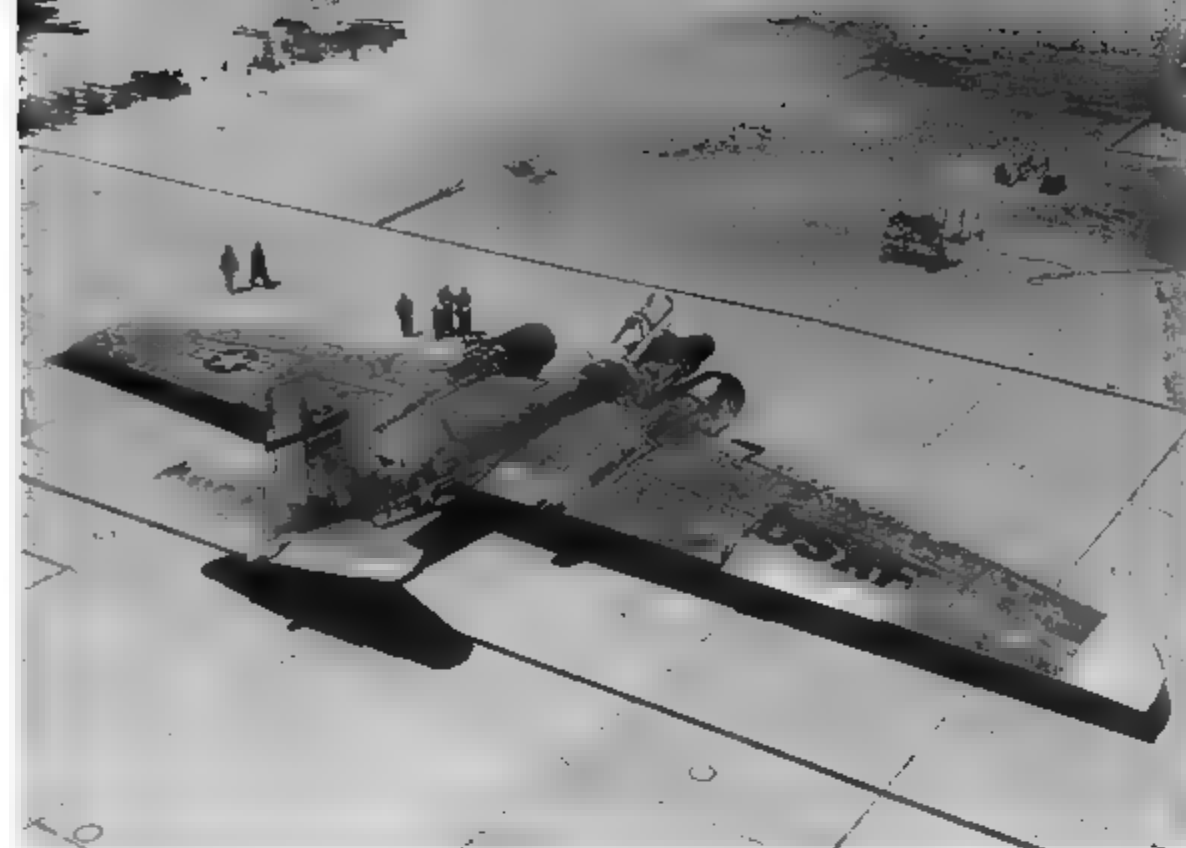
Of the twenty-one RB-57Fs produced, four were specifically designed for reconnaissance activities, and were given serial numbers in the '500' range to distinguish them from other RB-57Fs. Two each of these specialized reconnaissance versions were supplied to Yokota (501 and 503) and Rhine Main (500 and 502) Air Force Bases. The other RB-57F aircraft, while capable of a somewhat more limited reconnaissance role, were configured toward gathering weather and atmospheric data, including airborne radioactive debris and radiation detection information. Nevertheless, these aircraft were also used to perform reconnaissance missions, and on numerous occasions conducted overflights of both neutral and hostile countries.

Reconnaissance of hostile nations involved a degree of danger, however, and the first loss of an RB-57F occurred during a mission on 14 December 1965. An aircraft from the 7407th SS at Rhine Main took off on a reconnaissance mission along the southern border of the Iron Curtain. While over the Black Sea the RB-57F was hit by a Russian surface to air missile (SAM) and crashed into the sea. Despite crashing in open waters close to the Soviet Union, American ships were able to recover a significant portion of the airframe for examination. Unfortunately, neither crewman was found, and both were listed as missing in action for six months before being declared dead by the Defense Department. This incident is believed to be the only combat loss of an RB-57F by the United States, although two on loan to Pakistan were damaged — one by a SAM in the 1965 war with India, and the other by a bomb which hit the hanger it was in.

During the late 1960s the RB designation was changed to reflect the primacy of the weather gathering missions which the RB-57F variant carried out; these weather aircraft were redesignated WB-57Fs, but entailed no change in the basic airframe. WB-57Fs were used to gather atmospheric samples which checked for nuclear testing around the world, to monitor American nuclear tests, and to observe unusual weather conditions. In addition, the National Aeronautics and Space Administration (NASA) contracted with the Air Force for the use of a WB-57F in conjunction with its Earth Resource Technology Satellite (ERTS) program during the 1960s. Under this contract, the Air Force agreed to supply the pilot and maintenance personnel while NASA provided the various monitoring facilities and sensors. The majority of these sensors were located in a large pallet attached to the fuselage cavity similar to the removable bomb bay used on the earlier B-57B variant. This pallet was streamlined to create no appreciable drag.

This arrangement with NASA continued until 1972, when the Air Force, believing that the cost overrode the benefits, transferred the aircraft to NASA's control entirely. Two years later, when the 56th WRS was wound down, two more aircraft were transferred to NASA. Throughout the latter half of the 1970s NASA employed these WB-57Fs in various space projects, for air sample research, aerial photography, mapping, and weather research.

By the early 1980s the Air Force had put the majority of its remaining WB-57Fs in storage at Davis-Monthan AFB. NASA was the last agency to employ this variant but it too began phasing out operations and by 1985 all existing RB-57Fs were either in storage or in the process of being scrapped. While a few were placed in *involute* at Davis-Monthan AFB, it is only a matter of time until they too will be stricken from the Air Force inventory roles and relegated to a museum or the cutters torch.



(Above) The RB-57F's huge overall wingspan was just over 122 feet providing 2,000 square feet of wing area. (Kiefer)

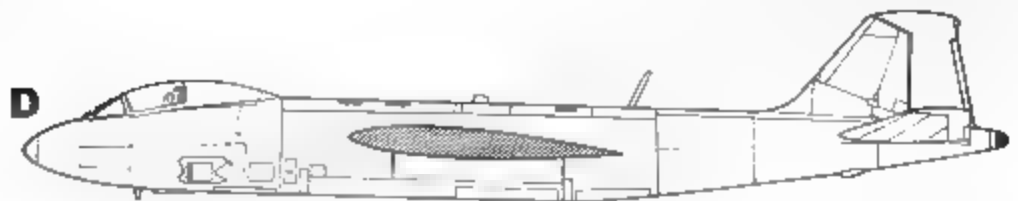
(Below) General Dynamics performed the airframe conversion work in its Special Projects hanger at its Fort Worth plant. These six B-57 fuselages are in the initial stages of the conversion program. Eventually, twenty-one airframes were converted to the RB-57F configuration. (General Dynamics/Thorton)





(Above and Below) The RB-57F received new, more powerful engines to provide the thrust needed to take the aircraft to heights approaching twelve miles above the earth's surface. Like the wing, these new engines were much larger than the standard Canberra powerplants. In addition, detachable auxiliary powerplants were mounted on the lower wing surface outboard of the main engines to augment power, increasing the aircraft's altitude capability by roughly half a mile. (Kiefer)

**RB-57 D**



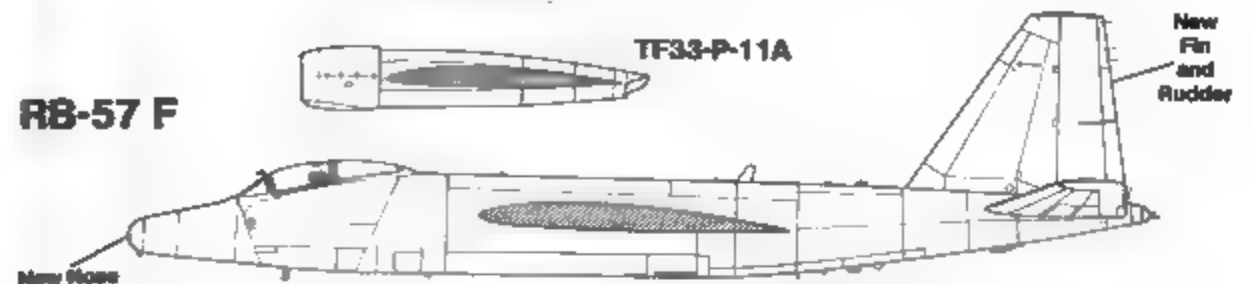
**J57-P-5**



**TF33-P-11A**



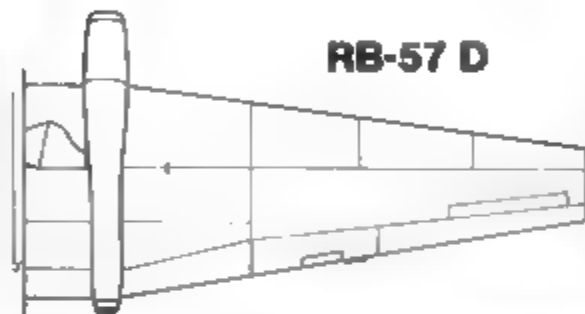
**RB-57 F**



New Nose

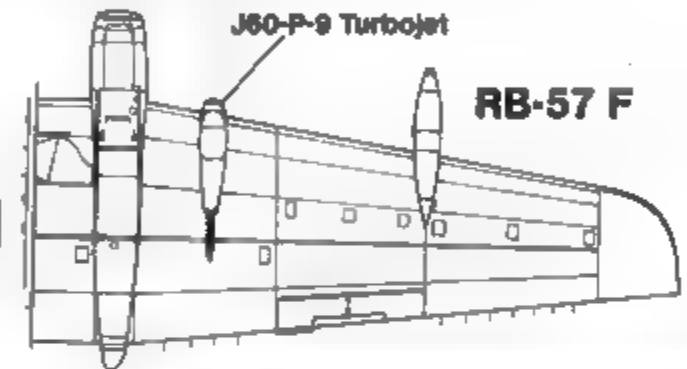
New Fin and Rudder

**RB-57 D**



**J60-P-9 Turbojet**

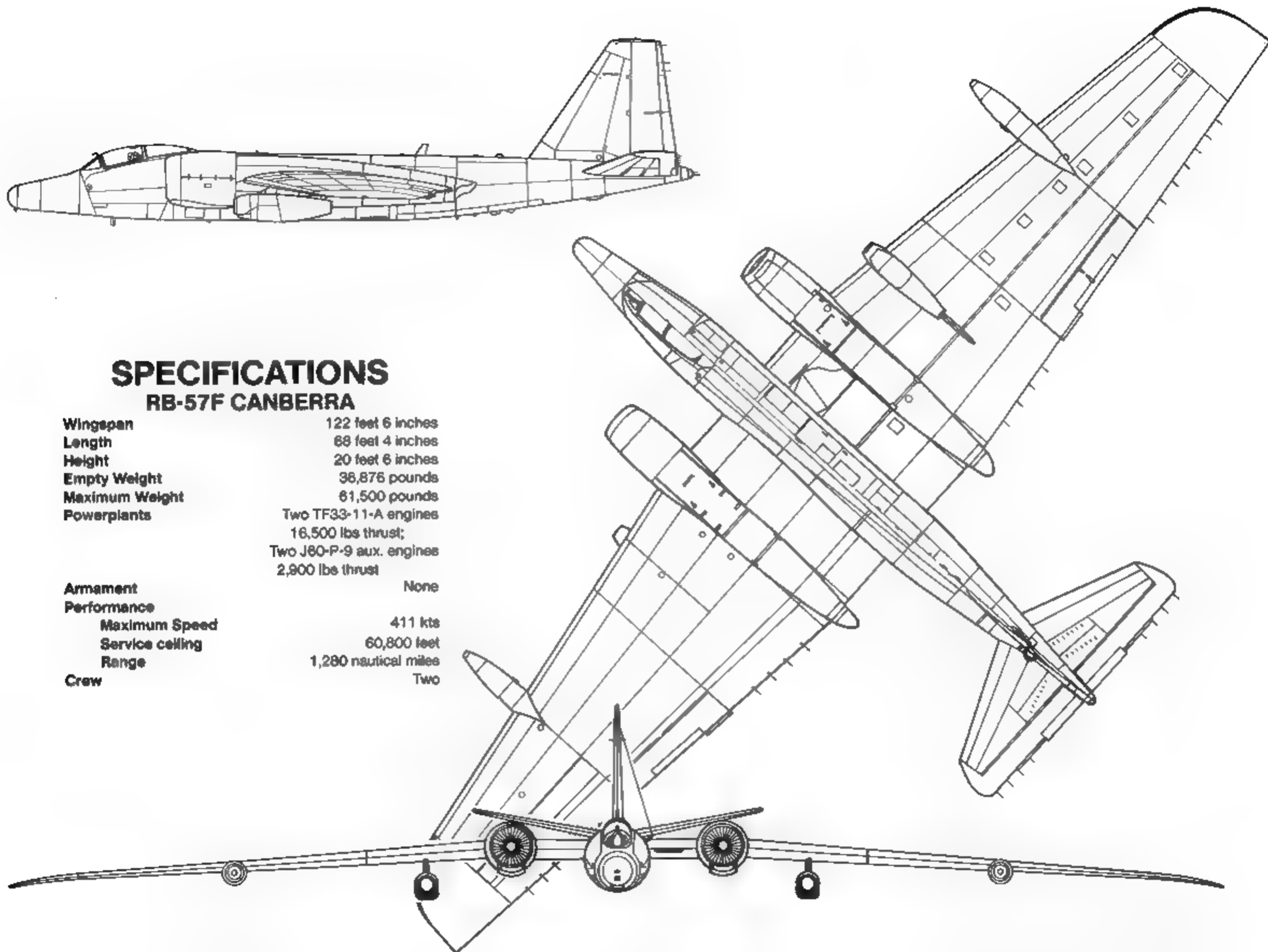
**RB-57 F**





an RB-57F near Eielson AFB, Alaska. The detachment at Eielson operated the RB-57F for eight years, monitoring activities along the northern and Pacific borders of the Soviet Union. The anti-glare panels wrap completely down the inside of the engine nacelles. (USAF)





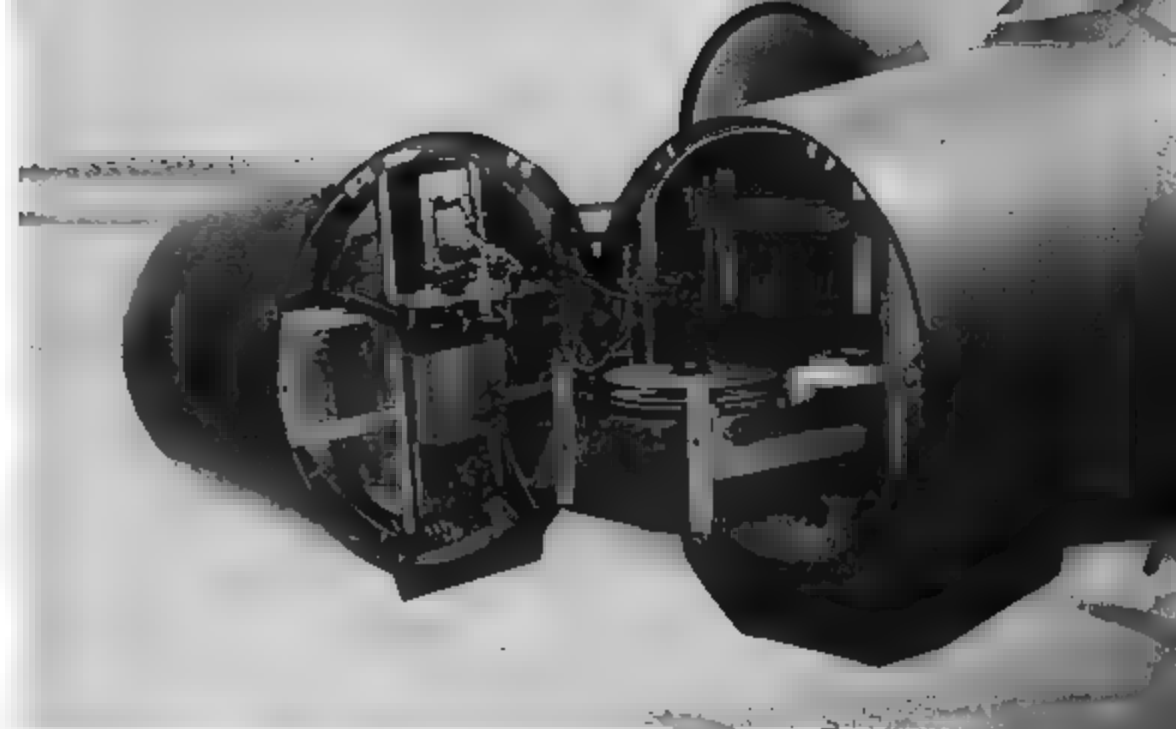
## SPECIFICATIONS

### RB-57F CANBERRA

Wingspan	122 feet 6 inches
Length	68 feet 4 inches
Height	20 feet 6 inches
Empty Weight	36,876 pounds
Maximum Weight	61,500 pounds
Powerplants	Two TF33-11-A engines 16,500 lbs thrust; Two J80-P-9 aux. engines 2,900 lbs thrust
Armament	None
Performance	
Maximum Speed	411 kts
Service ceiling	60,800 feet
Range	1,280 nautical miles
Crew	Two



(Above Left) When properly equipped, the RB-57F provided an excellent means of gathering air/gas samples following above ground nuclear tests. These air samples, which enabled scientists to determine the intensity and path of nuclear particles after an explosion, were picked up by probes mounted in the nose or engines. (General Dynamics/Thorton)



(Above Right) The hinged nose cone provided a good deal of space for a variety of sensory gear, and the racks made it relatively easy for the groundcrew to install a variety of devices for specific missions. (Lyons)

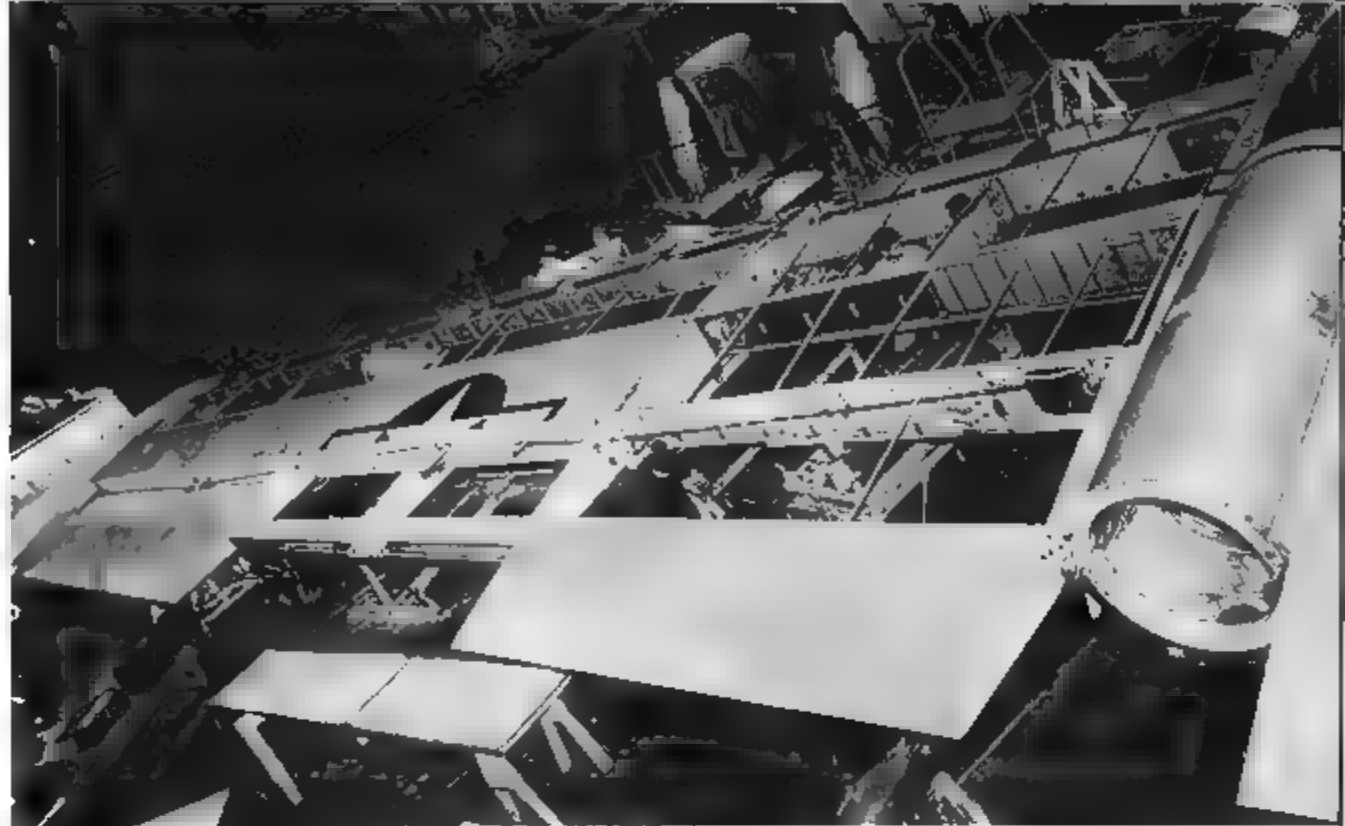
(Below) Air sampling pods could be attached to the wings to supplement the nose and engine collection points. This aircraft of the 58th WRS, Kirtland AFB, New Mexico collected air samples during nuclear tests in the American Southwest as part of OPERATION CAB-ROLET. (USAF)





(Above Left) A rather unusual modification was carried out on aircraft 13502 but little is known of the purpose of this special back seat configuration. ■ is possible that the aircraft was used in early laser research or by the Atomic Energy Commission in tests related to cosmic rays. (General Dynamics/Thorton)

(Below) NASA contracted with the Air Force to use the RB-57F for special research projects, however, during the early 1970s the Air Force ended the contract by turning over to NASA three phased-out RB-57Fs from the 56th WRS. The last ■ these RB-57Fs allocated to NASA, serialled 13298 (numbered 928 by NASA), takes off for an air sampling mission in the Caribbean. (USAF)



(Above Right) Wing fatigue eventually became a problem with the RB-57F variant as it had with the earlier RB-57D. When fatigue cracks were detected additional aluminum supports were added to the spars in order to strengthen the wings and prolong their service life. The new supports can be distinguished on the two front spars by the brightness ■ their color in comparison ■ the duller tones of the original material. (General Dynamics/Thorton)





## VIETNAM

During the late 1950s and early 1960s the pro-Western government of South Vietnam under Ngo Diem came under increasing attack from the Viet Cong (VC) supported by the North Vietnamese Army (NVA), and by 1963, despite US advisors and American military aid, the situation had deteriorated to a point where South Vietnam was on the brink of disaster. As conditions worsened the South Vietnamese army staged a coup, overthrowing Ngo Diem. However, this did little to improve conditions on the battlefield. By the spring of 1964, with South Vietnam on the very brink of defeat, the United States began to dramatically increase its military support of the faltering South Vietnamese government.

This precarious military position in South Vietnam prompted the Air Force to reverse plans to deactivate the 3rd BG, which had already begun rotating its B-57s back to the US. In April of 1964, even before their rotation to Korea prior to their return to the states, plans had been drawn up to deploy the Canberras to the Vietnam war zone. On 9 April, just one week after their return from Korea, the 13th Bomb Squadron (BS) flew twelve B-57s to Clark AFB in the Philippines. These were followed on 17 April by the Canberras of the 8th BS and later that month were joined by the squadron's remaining Canberras. This, however, was in direct contrast with the USAF's administrative paper movement in which the 90th BS and 3rd BG were returned stateside. Obviously, this was purely an administrative matter since it seemed to have had no bearing on the physical deployment of Canberras to Clark AFB.

Considering the desperate situation in South Vietnam, the Canberra crews anticipated prompt orders to deploy to bases either in Thailand or Vietnam; their anticipation turned into frustration when orders did not materialize and the stay at Clark became stretched on. As it turned out, political considerations prohibited the US from committing regular military forces against the Viet Cong or the North Vietnamese unless militarily provoked. This military provocation took place on 2 August when North Vietnamese gunboats attacked US destroyers in the Gulf of Tonkin. Forty-eight hours later the Canberras were put on alert for possible movement, but the hours passed and tensions heightened as they again sat waiting for orders. Finally, on the afternoon of 5 August the long-awaited order came, twenty B-57s were to deploy to Bien Hoa air base, near Saigon as soon as possible. Unfortunately, the late time of day when the order was received meant that the Canberras would have to land after dark at an unfamiliar air base. The five flights of Canberras reached Vietnam without problems, however two collided upon landing at Bien Hoa, blocking the runway and forcing the remaining B-57s to divert to Tan Son Nhut airport on Saigon's outskirts, where another Canberra crashed short of the runway (possibly due to enemy groundfire). After only a few hours in the war zone, the Canberras had lost two aircraft and one was damaged; it was not a good omen.



(Above) The crowded conditions at Bien Hoa were tailor-made for disaster. Since there was neither enough room for adequate dispersal nor for the construction of protective revetments, the aircraft were parked in the open, wingtip to wingtip. (USAF)

(Below) Following their deployment to Vietnam in August of 1964, because of political considerations, the Canberras were only allowed to fly unarmed reconnaissance missions. While these missions may have raised South Vietnamese morale somewhat, they did little to bolster the spirits of the US crews. The thick black smoke was normal when the charges to start the Canberra's engines were set off. (USAF)



Following the 3rd BG's deployment to Vietnam, its initial operations were little more than politically motivated aerial shows aimed at boosting the morale of the South Vietnamese. During the next seven months, as more aircraft arrived from Clark AFB, the 13th BS and 8th BS flew unarmed *road reconnaissance* missions, flying up and down the South Vietnamese road system (perhaps the politicians hoped to scare the VC off with the *American presence*). Morale of the Canberra crews dropped as a result of this unpopular, almost silly duty. The Air Force tried to bolster morale by rotating crews between Clark AFB and Bien Hoa, but this had little effect ■ reconciling the Canberra crews' knowledge that units flying propeller-driven aircraft were engaging the enemy. In addition, the crews complained that Bien Hoa was not equipped to handle large numbers of high performance aircraft, nor was there adequate dispersal space. As a result, a number of the Canberras were returned to Clark AFB ■ alleviate the overcrowding at Bien Hoa.

The move back to Clark proved fortunate. In the early morning hours of 1 November, the Viet Cong carried out a mortar attack on the B-57 parking ramp at Bien Hoa, and while short, the mortar rounds hit with devastating accuracy among the Canberras parked wingtip to wingtip. Of the twenty B-57s on the ramp, five were totally destroyed and all of the others were damaged. Following this attack, the overcrowding situation was reassessed, but no solution was found that did not reduce the number of B-57s operating out of Bien Hoa.

The mortar attack on Bien Hoa had no effect on the policy restricting Canberras to unarmed reconnaissance flights. Discouraged by their losses and with no opportunity to retaliate against the enemy, squadron morale dropped further. However, one Viet Cong success after another pushed Washington toward directly employing American military forces to stave off defeat. Canberras were about to enter the fray.

### Into Action

In February of 1965 the Canberras finally received the orders they had been waiting for. Acting under emergency orders, General Westmoreland, the American commander in Vietnam, lifted restrictions on their use, and on 19 February the Canberras carried out their first strikes against Viet Cong positions near Saigon, and while results of the missions could not be verified, morale jumped dramatically. More missions quickly followed, and by month's end the air war in Vietnam had taken on a new dimension. On 11 March, Canberras carried out their first out-of-country mission with an attack on the North Vietnamese staging area ■ Xom Bang. Despite intense ground fire, which had earlier claimed three F-105 Thunderchiefs, twenty Canberras dropped more than ninety-six tons of bombs on the target without a single loss. More daylight strikes against enemy targets in both North and South Vietnam followed with good results; however constant exposure to enemy fire took its toll — a B-57 was lost on 11 March, and another fell a month later. Both crews were killed.

Morale remained high as Canberra operations intensified during March and April, when B-57s began flying night interdiction missions against Viet Cong supply convoys on the Ho Chi Minh trail. These missions were often operated in conjunction with C-130 Hercules flare ships and Marine EF-10B Skyknight electronics warfare aircraft in order to locate and hit enemy trucking moving along supply lines in South Vietnam and Laos. When attacking supply routes in North Vietnam, however, Canberras carried their own flares since the use of C-130s was restricted to operations south of the demilitarized zone (DMZ). Assessment of damage caused during these nocturnal interdiction missions was difficult because of the darkness, but the numerous secondary explosions and post strike photos indicated that the Canberras were inflicting heavy damage.

### Disaster at Bien Hoa

During the spring of 1965, with Canberra operations in full swing throughout Southeast Asia and with crew morale at an all time high, disaster struck again — at Bien Hoa — a place remembered well by the 3rd BG. On Sunday, 16 May, as a four plane flight scheduled for an out-of-country strike prepared to start their engines, the lead aircraft exploded in a ball of fire, triggering an explosion which in turn consumed another B-57. Bullets, shrapnel and flaming debris were thrown in all directions, sparking a chain reaction of explosions among nearby aircraft. When the smoke finally cleared ten B-57 Canberras, eleven VNAF A-1H Skyraiders, and a Navy F-8 Crusader were smoldering junk; twenty Canberra crewmembers and eight Vietnamese were dead, and over a hundred persons were wounded. Bien Hoa was immediately closed to incoming traffic which was diverted to Tan Son Nhut.

As a temporary measure the B-57s moved to Tan Son Nhut until the damage was repaired. Despite their losses ■ men and material, the Canberras were flying limited sorties within four days of their transfer to the crowded Tan Son Nhut airport. Additional Canberras were transferred from the Nevada and Kentucky Air National Guard to make up for the losses but the number of aircraft available for deployment to Vietnam was limited since Marlin was no longer producing the B-57. As a result, the Air Force had a number of B-57Es and B-57Bs reconfigured for combat and sent over as replacements.



(Above) Disaster hit the Canberras at Bien Hoa on Halloween night of 1964, when the Viet Cong launched a brief mortar attack on the parking area, destroying or damaging twenty Canberras. This aircraft, a total loss, was one of the five that were damaged beyond repair. (USAF)

In late June of 1965 the B-57s left Tan Son Nhut, but instead of returning to Bien Hoa, they moved to Da Nang in the northern part of South Vietnam, where they were closer to targets ■ North Vietnam and had more operational space. However, the Air Force decided to keep only one squadron ■ Da Nang and moved the other squadron back to Clark AFB. Every sixty days the squadrons would rotate from Da Nang to Clark, allowing the crews to rest and train far from the war zone. Operations from Da Nang were similar to those flown out of Bien Hoa and Tan Son Nhut, although more emphasis was placed on night interdiction strikes into North Vietnam due to the closeness of the targets. Strikes in North Vietnam were among the roughest missions carried out by Canberra crews, and those who participated in them wore the coveted *Doom Pussy* patch in recognition of these dangerous assignments.

### VNAF B-57s

The move to Da Nang provided the B-57 crews an opportunity to work with Vietnamese pilots and navigators being trained to operate the Canberra. The program to introduce Canberras into the VNAF had begun in May of 1964 when the Canberras first arrived ■ Clark AFB. Six Vietnamese pilots, including the VNAF commander, Nguyen Cao Ky, went through an abbreviated training course to prepare them to fly the B-57, well before the formal announcement of the program was made in August of 1965. The four Canberras scheduled for delivery to the VNAF were officially turned over on 9 August at a public ceremony, but in reality remained under US control. Shortly, a new training program was started at Clark AFB for twelve VNAF crews and maintenance personnel, along with one of the original pilots, Major Bien, who had returned for a refresher course. After the Vietnamese finished training at Clark they were sent to Da Nang where they were matched with American crewmen, flying missions until they were ready to operate on their own, ■ which time they began flying missions alongside US B-57s.

(Below) This aircraft was totally consumed by the fires which raged along the flight line after the mortar attack. The aircraft in the background suffered extensive damage and had to be written off. Even after this devastating attack Washington would not allow the Canberras to attack the enemy. (USAF)



Unfortunately, while some of the Vietnamese crews performed very well, problems developed within the VNAF program at Clark which interfered with training and lowered morale. An accident in January of 1966 exacerbated the problems, causing some pilots to complain that the Canberra was physically beyond their capabilities. The beleaguered program reached a tragic climax when Major Bien, one of its key supporters, was killed in an accident. Bien was returning from a strike when he had to divert from Da Nang to Pleiku because of weather. At Pleiku, his B-57 could not be started after landing and was manually pushed off the runway. Major Bien, trying to steer the plane with the brakes, sensed a loss of brake power as the plane began to roll. Jumping out, he inadvertently fell under the main wheels and was crushed. Coming in the wake of the other problems this incident finished the VNAF B-57 project.

### Phan Rang — The Final Move

Following an Air Force decision to deploy F-4 Phantom IIs to Da Nang, the Canberras moved again in October of 1966, this time to Phan Rang, near Nha Trang and Cam Ranh Bay. There was little change in operations, and losses, while not high, served to remind the Air Force that the years were catching up with the Canberra. In January of 1968 the 13th BS was officially deactivated, leaving only the 8th BS to continue the war effort with the B-57. In reality this did not affect operations since only one squadron operated at a time out of Phan Rang. However, it did mean that support personnel at Clark had to move to Phan Rang.

It was obvious to the 8th BS that their deployment to Phan Rang was temporary, since by the summer of 1969 the squadron was down to just nine combat aircraft, and four B-57Cs for training and familiarization at Clark. As a result, missions were primarily flown at night against targets on the Ho Chi Minh trail in Laos. The Air Force decided to retire these old Canberras and in September the crews began ferrying their B-57s back to the US. The last aircraft, number 551, departed Phan Rang in October, concluding B-57 operations in Vietnam. The 8th BS designation was transferred to a fledgling A-37 squadron based, ironically, at Bien Hoa.

(Below Left) The Canberras were finally released for combat operations in early 1965 and immediately began flying combat missions across the length and breadth of Southeast Asia. These two B-57s fly low over the Mekong Delta in search of targets of opportunity. (USAF)

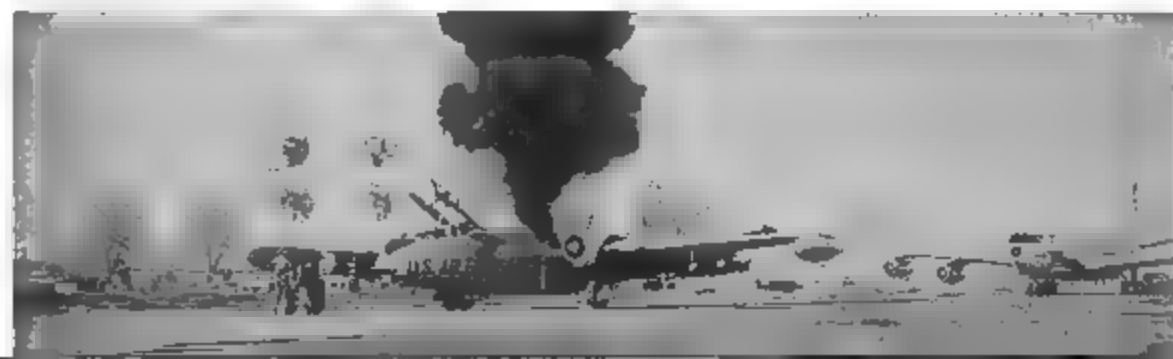


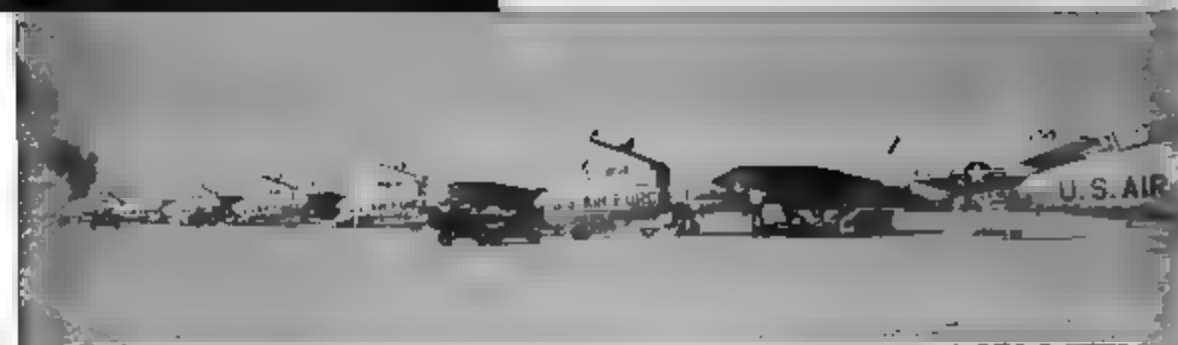
(Above) When the 8th and 13th Bomb Squadrons deployed to Vietnam they carried the same markings which were carried while based in Japan. The 8th used Yellow for its fin letter, nose cone, and fuselage stripe while the 13th used Red. Green markings however, were carried on aircraft that had been received from the deactivated 90th Bomb Squadron. Both fuselage stripes and tail letters can be seen on these two B-57s on their way to a target in South Vietnam. (USAF)



(Above) This B-57 begins its dive on a Viet Cong target northwest of Quang Nhai during a strike at enemy base camps with nine 500 pound bombs in the bay and four 750 pounders on the wing racks. During a ground attack two to four B-57s would release only one or two bombs on each pass in order to keep the enemy under continuous attack. With four aircraft, each carrying thirteen bombs, such tactics kept the enemy pinned down for a long time allowing additional aircraft to arrive and take part if necessary. (USAF)

(Below Right) Following the tragic accident at Bien Hoa the surviving B-57s operated out of Tan Son Nhut until Bien Hoa could be cleaned up. Tan Son Nhut was just as crowded as Bien Hoa, and the Canberras had to share the runways with civilian aircraft such as Pan Am 707s. (Helm)





The B-57s were destined never to operate out of Bien Hoa in squadron strength again. The Air Force decided to move the Canberras north to Da Nang in order to bring them closer to targets in Laos and North Vietnam. Conditions at Da Nang were also much less crowded which resulted in better working conditions. These B-57s are from the 8th Bomb Squadron. (Helm)

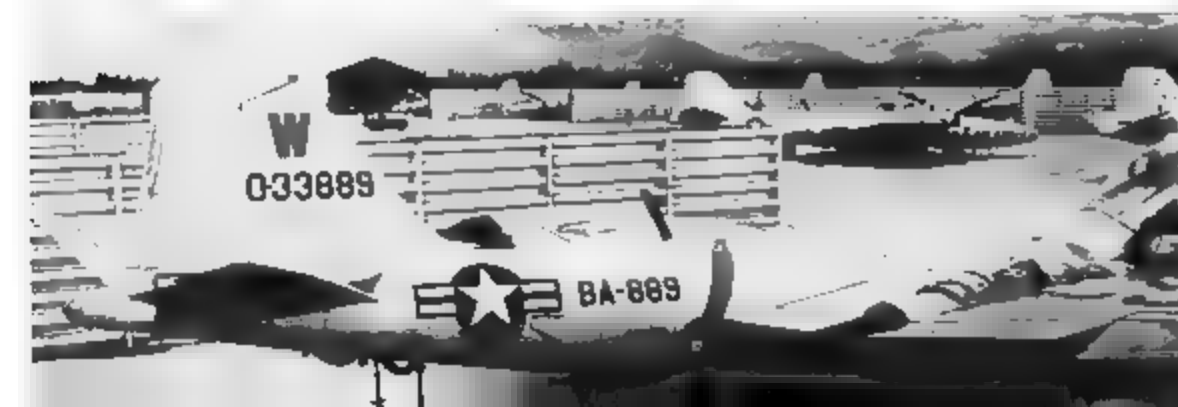


(Above) At Da Nang, South Vietnamese pilots began flying missions in Canberras as part of a program to up-grade the Vietnamese Air Force. Eventually problems with the program resulted in it being quietly dropped. While no B-57s were actually turned over to the South Vietnamese a few did carry South Vietnamese markings such as this aircraft of the 8th Bomb Squadron.



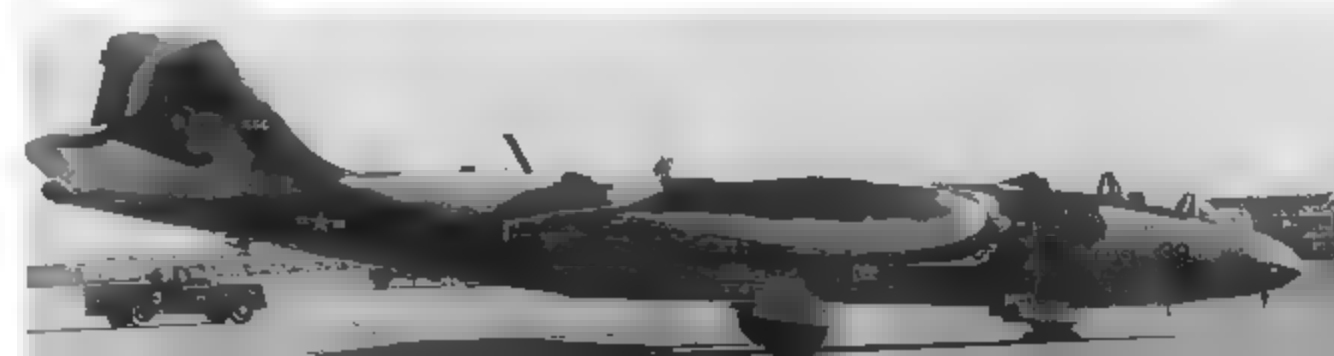
(Above) Since Martin was no longer producing the B-57, to replace those lost in combat and in the two Bien Hoa disasters, the Air Force raided several National Guard units for replacements. This B-57 was from the Kentucky Air Guard, whose insignia remains outlined on the tail despite efforts to remove it. (USAF)

(Below Left) The threat of Viet Cong mortar and sapper attacks prompted the Air Force to build revetments to protect the aircraft at Da Nang. These revetments minimized damage from accidental explosion or fire and cut down on shrapnel damage from incoming mortar rounds. (USAF)



(Above) Da Nang was the hub of an enlarged war effort against North Vietnam. Framed by a pair of 750 pound bombs on the wing of another B-57 a Canberra taxis out for a mission north as an EC-121 takes off to monitor both allied and enemy activity over the north. (USAF)

(Below Right) For a short period following the introduction of the three tone camouflage scheme no tail codes were carried. The Light Gray undersides were disliked by the Canberra crews since they felt that the color did not offer enough concealment at night. This B-57 carries one of the few examples of personalized markings seen on a B-57 during the war. Underneath the cockpit is the name *CONG BUSTER* with the drawing of a bomb falling on the head of a Viet Cong soldier. (Robinson via Bishop)







(Above) Eventually the undersurfaces of camouflaged B-57s were painted Black in keeping with their night interdiction mission, making the crews immensely happy. In addition, tail codes were added, 'PQ' for the 8th BS and 'PV' for the 13th BS. The 13th BS departed in January of 1968, and the 8th BS in October of 1969. This Canberra with Black undersurfaces and tail codes belongs to the 13th BS. (USAF)

(Left) Because the B-57 was relatively low to the ground, maintenance was somewhat more easily performed than on other aircraft. This ground crew changes an engine with a hoist. The ease in handling major work like this resulted in a high availability of aircraft for missions. (USAF)

(Below) Following their return from the war zone most of the Canberras went to the aircraft graveyard at Davis-Monthan AFB for storage and eventual reclamation. The three tail codes represented units which participated in the Vietnam War, either directly or indirectly. PV and PQ were assigned to the 13th and 8th Bomb Squadrons respectively, which operated in Vietnam; while FS belonged to the 4424th Combat Crew Training Squadron which trained B-57G crews. (Mesko collection)



## Foreign B-57s

Compared to other types of American aircraft supplied to US allies, the B-57 saw only limited service with a few nations receiving American military aid. Aside from the South Vietnamese, only Nationalist China and Pakistan received the B-57 Canberra.

In response to a CIA request in 1958 Nationalist China began flying the Canberra in a reconnaissance program over mainland China. Beginning during the latter part of 1958 and continuing into early 1959, six Chinese pilots received B-57 training at Laughlin AFB, Texas. Following the pilots' return to Taiwan, US pilots ferried three RB-57Ds across the Pacific to Taoyuan AB, near Taipei. Two B-57C trainers from the 3rd Bomb Wing in Japan were flown to Taoyuan where they were used to continue training the Chinese pilots, and a support team of Air Force personnel arrived to supervise the entire program. At least two, and possibly more, of the Chinese pilots were used in the program, code named 'Diamond Lil'. Operations began in early 1959 and a huge amount of intelligence was gathered which proved exceedingly helpful during the Formosa Straits crisis. Although able to elude communist fighters while at altitude, at least one RB-57D was lost when it made a premature descent toward Taiwan. Eventually, the wing fatigue problem which plagued the RB-57D variant forced a halt in the program and the two remaining Canberras were returned to the US.

The only other American ally to use the B-57 was Pakistan, which received twenty-five B-57Bs and Cs under the Military Defense Assistance Plan (MDAP), and provided in 1959 from assets of the deactivated 345th Bomb Group as part of an overall program to modernize and strengthen the Pakistani Air Force (PAF), forming the 31st Bomb Wing. Composed of two bomb squadrons, the 7th and 8th, it was based at Mauripur Air Base, near Karachi. To assist in training the Pakistani aircrews, a USAF team was dispatched to Mauripur to help get the squadrons operational.

During negotiations the Pakistanis stipulated that they wanted aircraft equipped with all-weather bombing capability; unfortunately, in meeting the delivery date of September 1959, the B-57s were delivered without all weather equipment. The US promised to supply the system as soon as possible. When the RB-1A all weather bombing system finally became available in mid-1963, it was installed in four replacement nose sections (two B-57Bs and two B-57C/Ds) and transported to

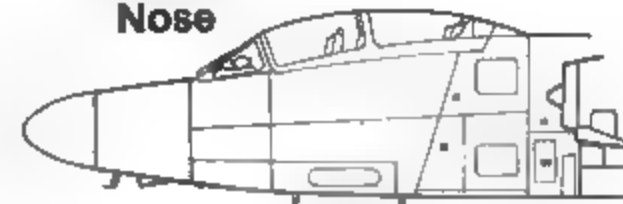
Karachi to be fitted to four Pakistani B-57s. The nose sections removed from the Pakistani Canberras were then sent back to the United States and the cycle was repeated until all of the Pakistani aircraft were equipped with all weather capability. During the modification it was necessary to lengthen the nose and change its shape to a more pointed profile. In addition, some of the Canberras had their wing racks modified to carry four F-86 drop tanks in order to increase their range sufficiently to reach the Indian capital of Calcutta.

Tension between Pakistan and India, antagonists since the bloody partition of the British-ruled Indian sub-continent in 1947, erupted into open warfare in September of 1965, exactly six years after Pakistan had received her B-57s. While lasting only twenty-three days, the war saw intensive air activity by both sides. The Pakistani B-57 Canberras were opposed by English Electric Canberras which had been supplied to the Indians by the British in early 1959. The presence of English Electric Canberras had been one of the reasons for Pakistan's decision to modernize her air force with the American-built Canberra bomber.

**Standard  
Nose**



**All-weather  
Nose**



(Below) In 1958 the CIA began training Nationalist Chinese pilots to fly the RB-57D on reconnaissance missions over mainland China. Chinese personnel were trained by the US Air Force and three RB-57Ds, along with the two B-57C trainers, were supplied to the Nationalists. This RB-57D is seen at Taoyuan AB, Taiwan. All lettering is in Red while the insignia is Medium Blue and White. (Mikesh)



Early in the conflict Pakistani B-57s were used as night intruders against Indian air bases. A large number of B-57s were moved to forward air bases in order to increase their sortie rate. During the first few days some crews flew as many as three missions within a nine hour period, but crew fatigue and weather conditions eventually resulted in their being restricted to two missions a night. While PAF B-57s were employed almost exclusively at night, they carried out a daring daylight raid against the important Indian radar site at Amritsar. This radar site provided early warning of Pakistani air strikes and also controlled Indian fighter and bomber sorties. From the beginning of the war it had been the target of numerous air attacks but weather conditions, heavy ground fire, and effective camouflage had contributed to thwarting the Pakistani strikes. Finally, the Pakistanis decided to use the B-57 in a daylight attack to destroy the site. Originally the mission had been planned to use an RB-57 specially fitted with ELINT (Electronic Intelligence) equipment as a lead ship which could direct the other bombers to release their bombs; however, this aircraft had been lost during a practice mission. Despite this setback, the Pakistani high command decided that a daylight attack would have to be undertaken anyway. Covered by strong fighter escort, four B-57s each carrying 7000 pounds of explosives dive-bombed the Indian radar site in the face of intense ground fire. The Pakistanis succeeded in knocking out the site, and while it eventually returned to use, the site functioned at a much lower level of accuracy than before.

In addition to these raids the Pakistani's used an RB-57F to fly a number of high level reconnaissance missions. Operating at altitudes of up to 67,000 feet, the RB-57F was out of the reach of all Indian fighters in service. However, while returning from a mission the aircraft suffered near misses from two SA-2 Guideline SAMs as it began its descent. One of the auxiliary turbojets was knocked out and major structural damage was incurred. Although severely damaged the RB-57F made it back to its base where over 170 holes were counted. In addition, the nosewheel could not be lowered during

(Below) In 1959 the United States provided Pakistan with twenty-five B-57s of various models under the Military Defense Assistance Plan. These aircraft equipped two bomb squadrons and saw action in both the 1965 and 1971 wars with India where they flew against Indian Air Force British-made Canberras. This B-57C was transferred from the deactivated 345th Bomb Group to Pakistan in 1959. Overall Black the aircraft's markings are Red and the insignia is Green and White. (Mikeah)

the landing which resulted in even more damage to the aircraft. Without special equipment or training the ground crew, nevertheless, was able to repair the Canberra and it was eventually returned to the US.

During the course of the war four B-57s were lost, one of which was mistakenly shot down by Pakistani troops. When the war began the United States had placed an embargo on military aid to Pakistan, and as a result the Pakistanis were forced to manufacture or recondition old parts to keep their B-57s in the air, until by the late 1960s replacement of the aircraft's J65 engines became a major concern. In 1970 the US gave Pakistan the option of buying selected amounts of equipment as a one-time only deal to balance Russian sales to India. Included in this package were seven additional B-57s but these were not purchased.

India and Pakistan were again at war again in December of 1971. Fighting continued for some two weeks, and while the air war was not as intense as the 1965 conflict, Pakistani aircraft losses were significant, including a number of B-57 Canberras. These Canberra losses could not be sustained since natural attrition and spare parts had reduced the total number of operational B-57s available to the PAF below squadron strength. In May of 1970, following the deactivation of No. 8 Squadron, the available Canberras were consolidated into No 7 Squadron. Post-war attrition further reduced the number of operational B-57s, until by the early 1980s only a few Canberras remained in service for use in night interdiction, sea search, and surveillance roles.



# B-57G

A major problem which plagued the Air Force throughout most of the Vietnam War was its inability to prevent the flow of supplies down the Ho Chi Minh Trail to Viet Cong and North Vietnamese troops inside South Vietnam, and while US airpower limited the daylight movement of men and materials, nightfall effectively blunted American interdiction efforts allowing the flow of supplies from North Vietnam with only minor losses. The Air Force conducted numerous tests to find solutions to this problem.

Based on early nocturnal experience with the B-57 in Vietnam, the Air Force decided to modify a few Canberras to test a new low-light level television (LLTV) in order to determine how effective it was under combat conditions. Under the Code name 'Tropic Moon II', three B-57Bs (serial numbers 52-1518, 52-1580, and 53-3860) were equipped with a television pod under the left wing. Operating from Phan Rang, the three B-57Bs flew sorties from December of 1967 through July of 1968. Encouraged by these tests the Air Force placed an order for a specific night interdiction variant of the B-57. This variant, designated the B-57G, eventually came about through the 'Tropic Moon III' program, conducted to test various items of equipment which would make the aircraft a self-contained, all weather, night interdiction weapons system.

Sixteen B-57Bs were chosen from the aircraft at Phan Rang and returned to Baltimore, during early 1969, where they were modified under a joint contract between Martin and Westinghouse. While Martin fabricated a new nose section, Westinghouse installed the three sensors — forward looking radar, infra-red, and low-light level television. In addition, a laser tracking device was incorporated to allow the crew to guide 'smart bombs' onto a target with pinpoint accuracy. Control of the equipment rested with the back seat systems operator who received information via the various sensors. The information was then fed through a computer to the pilot who made the decision to drop the ordnance. This new technology, however, required some changes in the tactics used during a bomb run. Bombing runs were normally conducted between 5,000 and 7,000 feet, but if the laser guidance system was used at these altitudes the pilot would have to make a slow, shallow glide since the system was designed for use at 1,500 feet or below. This tactic allowed the crew time to compensate for the extra altitude and guide the smart bomb to its target. The wing mounted guns were removed from the B-57G variant, which was designed exclusively for the level bombing role and did not require wing armament, eliminating the weight of the guns.

The first B-57G was accepted by the Air Force in July of 1969, and was flown to MacDill AFB in Florida by Lieutenant Colonel Paul Pitt. Colonel Pitt was in command of the 13th Bombardment Squadron (Tactical), which had been reactivated to take the new B-57G Canberra into action. After nearly a year of intensive training the unit moved to Ubon, Thailand in September of 1970 with eleven aircraft, where it became part of the 8th Tactical Fighter Wing. Four B-57Gs along with four B-57C trainers remained at MacDill AFB to provide mounts for replacement crew training conducted by the 4424th Combat Crew Training Squadron.\*

The B-57G performed well during operations, and were well liked by their crews because they provided the airmen with an instrument which they could use to hit North Vietnamese supply convoys along the Ho Chi Minh Trail. Crews flying the B-57G found that its modifications enhanced certain flight characteristics, while depreciating others. During flight the large nose area provided a more stable bombing platform and aided in instrument landing approaches. Unfortunately the extra weight of the nose lowered the aircraft's speed (though this was not a critical factor due to the mission requirements) and reduced the B-57G's single engine performance.

The 13th BS operated out of Ubon until the spring of 1972. During its operational service only one B-57G was lost, this occurring in December of 1970 when an aircraft flown by Colonel Pitt went down in southern Laos. Fortunately, Pitt and his operator were rescued, and following their retrieval from the jungles of Laos both fliers suggested ground fire as being the cause of their aircraft's loss. However, further investigation found that an O2-A Forward Air Control (FAC) aircraft operating in the same area was also missing, leading the Air Force to conclude that the two planes had possibly collided in the darkness.

\*A fifth B-57G crashed the previous December while performing a single engine test, killing Martin test pilot Bob Turner.



(Above and Below) While the interior of the B-57G was crammed with a variety of 'black boxes' the only significant exterior change was the new nose which housed the low-light level television (LLTV). The new nose caused little change in handling characteristics although the additional weight did lower overall performance, especially the Canberra's one engine performance. (USAF)



Following their withdrawal from Thailand, the remaining B-57Gs were assigned to the 180th Tactical Bombardment Group of the Kansas Air National Guard, where they remained for two years until they were consigned to the reclamation depot at Davis-Monthan, AFB in Arizona. The relatively short operational life of the B-57G with both the Air Force and the Air National Guard can be explained in two words: money and maintenance. These modified aircraft cost millions of dollars and since their targets were relatively cheap trucks, the planes were not considered cost effective, even though they were relatively successful. In addition, they were a maintenance nightmare due to the nature of their sophisticated equipment and the problems brought about by the hot, humid weather conditions. Other aircraft, such as the AC-130 gunship could perform essentially the same mission in a much lower cost and with far fewer maintenance problems. While the B-57G Canberra variant did not prove a viable weapons system, it did a great deal of pioneer work with night interdiction equipment, providing a foundation for other aircraft to build upon.





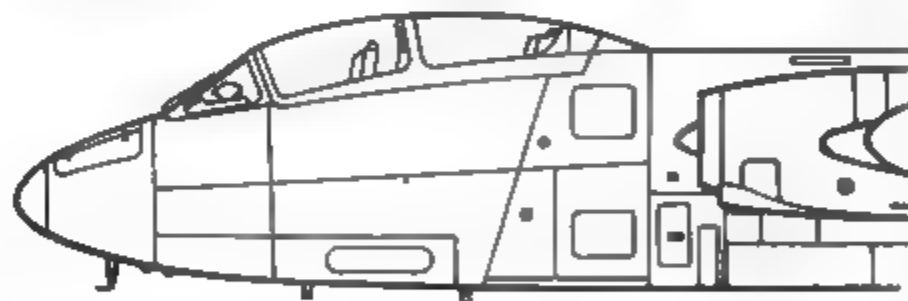
(Above) The B-57G may have looked rather ungainly, its array of sensors made it a deadly adversary. Extensive testing prior to deployment to Southeast Asia showed that the plane could effectively operate at night or during inclement weather conditions. (USAF)



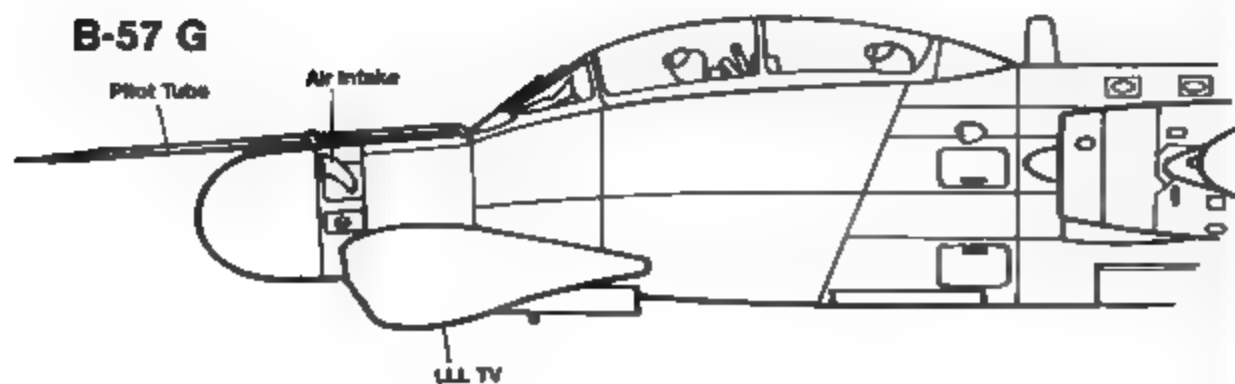
(Above) The large probe was mounted above bulbous containing the low-light level television and other sensors for its night intruder mission requirements. This B-57G of the 4424th Combat Crew Training Squadron, 1st Tactical Fighter Wing, was used to prepare crews for duty in Southeast Asia. (Buchanan via Bishop)

(Below Right) A system which was tried on the B-57G was the PAVE GAT featuring a downward firing M61A1 gatling gun turret mounted in a gimbal mechanism allowing the gun to traverse a full 360 degrees. Tied in with an electro-optical sensor computer this gatling gun proved very accurate but the project never got beyond the design stage. (USAF)

**B-57 B**



**B-57 G**





(Above Left) This Canberra of the 13th Bomb Squadron is parked under the hot tropical sun in its revetment at Ubon AFB, Thailand in December of 1970. While the B-57G's service career lasted less than two years, it nevertheless made a significant contribution to the war effort and played an important part in disrupting the flow of supplies down the Ho Chi Minh trail. (USAF)

(Below Left) Aircraft in Southeast Asia had to operate under difficult weather conditions, and to complicate matters further, B-57G crews faced these weather conditions at night. This B-57G flies into rough weather over the Thai countryside. (USAF)



(Above Right) The B-57G was used solely for night intruder work since USAF officials did not wish to jeopardize the multi-million dollar aircraft in daylight missions where it would come under ground fire. The complex electronic systems posed a number of problems to the ground personnel who were constantly trying to keep the systems operating, however the B-57G's nocturnal mission allowed the ground crew the entire day to work on the planes, easing the maintenance job considerably. Ubon 1971. (Knowles via Bishop)

(Below Right) The 'FS' tail code was assigned to the B-57Gs flown by the 4424th Combat Crew Training Squadron at MacDill AFB, FL. Originally posted to the 15th Tactical Fighter Wing, which was later redesignated the 1st Tactical Fighter Wing. (Mesko collection)



## Air National Guard Service

Following the Korean War, the US made a concerted effort to upgrade the Air National Guard (ANG). As part of this modernization effort in 1958 the Air Force transferred its RB-57As to four ANG units which were subsequently reassigned to tactical reconnaissance roles. The ANG squadrons which received the Canberras were the 117th Tactical Reconnaissance Squadron (TRS) of the Kansas ANG, the 154th TRS (Arkansas ANG), the 165th TRS (Kentucky ANG), and the 172nd TRS (Michigan ANG). In 1961 another unit, the 192nd TRS (Nevada ANG) also received RB-57As.

Throughout the late 1950s and early 1960s ANG units received additional RB-57s to supplement the original RB-57As which were gradually being retired. The Canberra-equipped ANG squadrons were never called up for Federal service, although they were placed on alert during several crises and were also used to photograph the destruction resulting from natural disasters, such as hurricanes and tornadoes. During 1965, evolving mission requirements and the immediate need for replacement Canberras in Vietnam, determined that three units — the 154th, the 165th and the 192nd — should relinquish their B-57s for McDonnell RF-101 Voodoos. In May of 1971 another unit, the 172nd, received a new mission and gave up its RB-57s for Cessna O-2As.

Following this requisitioning of ANG Canberras into Air Force service, only the 117th TRS (Kansas ANG) continued to operate B-57s in a reconnaissance role for the states. During the summer of 1972 the 117th TRS converted to a tactical bombing squadron, turning in their RB-57s for B-57Gs which had just returned from Vietnam duty. These B-57Gs were used for two years before being replaced when the unit was assigned to the Aerospace Defense Command (ADC) as a Defense Systems Evaluation Squadron (DSES). The 117th DSES was joined by another ANG unit, the 158th DSES (Vermont) which converted from Convair F-102s to Canberra EB-57B and Es. The 117th DSES operated the EB-57 until 1978 when it converted to a refueling squadron, ending twenty years of flying Canberras. The 158th DSES flew their EB-57s for another four years, but in 1982 they too, relinquished their Canberras converting to McDonnell F-4D Phantom IIs. The conversion of the 158th DSES ended ANG use of the Canberra culminating a service career spanning nearly a quarter of a century.

(Below Left) The Air Force's displeasure with the RB-57A resulted in the majority of these aircraft being assigned to the Air National Guard when the B-57B became available in large enough numbers. One ANG unit to receive the RB-57A was the 172nd TRS, 110th TRG, of the Michigan ANG. These aircraft were usually overall Natural Metal with the the National Guard emblem and state name on the tail. (Davidson via Bishop)



(Above) An initial production B-57B, this Canberra was assigned to the Kentucky Air National Guard from 1958 until 1965, when it was sent to Vietnam to replace the losses suffered at Bien Hoa and eventually became the last Canberra to leave Vietnam. It was later converted to an EB-57B, serving with the Kansas and Vermont Air National Guard prior its retirement in 1982. It has since been transferred to the National Air and Space Museum in Washington DC for conversion back to the tactical bomber configuration and eventual public display. (Arrington)

(Below Right) Periodically over the years ANG units upgraded their status, receiving newer Canberra variants as they were phased out of USAF service. This RB-57B belonging to the 154th TRS, 169th TRG, of the Arkansas ANG and is finished in the overall Glossy Black scheme common to B-57s during the mid and late 1950s. The markings on the nose and tail are Yellow around a central diamond in White and Black. (Collect Air Photos)





(Above) The Kentucky ANG carried a number of different schemes on their Canberras. These Kentucky ANG RB-57Bs are parked on the ramp of the 165th TRS, 123rd TRG at Shaw AFB, South Carolina ■ 1961 during exercise 'Swift Strike'. (USAF)

(Below) Following their return from Southeast Asia the B-57Gs were assigned to the 117th TBS, 190th TBG, of the Kansas ANG which operated it for only two years before the aircraft was retired and unit's mission was changed to a Defense Systems Evaluation Squadron in 1974. Forbes Field, 1973. (Photo by J E Rotramel via ■ Picclani)



(Above) During the mid-1970s the Kansas and Vermont ANG were given new assignments as Defense Systems Evaluation Squadrons and re-equipped with EB-57Bs. This EB-57B of the 134th DSES, 158th DSEG, Vermont ANG touches down at Offutt AFB, Nebraska in April of 1981. This was the last unit to operate the Canberra and finally phased the Canberra out in 1982 when it converted to Phantoms. (Cockle)

(Below) To maintain pilot proficiency various ANG units kept a number of B-57C trainers on hand. In 1971 a number of these were repainted Glossy Black by the Vermont ANG, reminiscent of Canberras in the 1950s and is seen during an airshow at Rickenbacker AFB, Columbus, Ohio during the spring of 1978. (Mesko)





## Test Canberras

Due to its size, performance, and payload the B-57 Canberra was an obvious choice as a test bed for a number of special projects. Several Canberras were modified to carry the noses of missiles then under development, being used as missile simulators for training purposes and to test various systems in the missile guidance program. They provided an ideal test bed with the backseater monitoring the various systems and working with the ground tracking stations. In addition they were able to carry a variety of sensory devices for calibration and to check how the missiles would function under actual operational conditions. A Canberra was even used to launch a Jaguar missile designed to measure radiation levels in the upper atmosphere, allowing the missile to reach higher altitudes than if it had been launched from the ground.

Both military and civilian agencies used the Canberra for testing. One rather unusual test operation involved NASA and its attempt to find alternative sources of aircraft fuel. A B-57B was specially fitted to function on hydrogen, the first aircraft ever to be so powered; and although successful, the problems associated with such a fuel system were too great and nothing ever became of the project. Airframe life, the Vietnam War, and maintenance difficulties were all contributing factors in the Canberra being withdrawn from the testing role during the late 1960s.

(Below) This RB-57A flew over 3600 hours in the test and evaluation role until it was retired in 1969. In the test role the aircraft was sometimes referred to as an NRB-57A. The pilot on the aircraft's final mission was Robert Mikesh, noted aviation historian and curator of the National Air and Space Museum. (USAF)



(Above) This B-57B was used to test missile guidance systems, and is seen carrying the seventeen foot nose of the Bomarc surface to air missile system. (USAF)



(Above) In addition to serving as test beds, Canberras were used in other forms of research. This B-57B carried a Jaguar sounding rocket which was launched to measure radiation in the upper reaches of the atmosphere. (USAF)

(Below Right) Under the designation JB-57B, this Canberra was used at Patrick AFB, Florida, to evaluate missile tracking cameras which focused on the test patterns painted on the fuselage side. (USAF)



## Defense Systems Evaluation Squadrons

Because of its size, range, speed, and altitude capability the B-57 Canberra was an ideal platform to simulate an enemy aircraft attempting to penetrate US airspace. Initially the Canberra carried out this function without any special equipment, however, as the efficiency of interception systems in both aircraft and ground stations increased during the 1950s, interception of the Canberra became far too easy. In 1959 the Air Force decided to modify a number of RB-57As from deactivated reconnaissance units for this mission.

Returned to the Martin plant the bomb bays of the RB-57As were modified to include the latest electronic countermeasure systems to disrupt the defending air and ground units. Initially these systems were powered by a wind-driven generator in the bomb bay, however, the great quantities of electricity required by these 'black boxes' necessitated that a constant-speed Sunstrand generator mounted in the engine nacelles be substituted for the original direct drive generators. To accommodate the new generator a larger air scoop was added under the air intake. Besides the 'black boxes' in the bomb bay, chaff dispensers were carried on the wing racks. An electronics warfare officer (EWO) replaced the navigator coordinating all of the equipment which was carried to confuse the defenders.

Initially the RB-57As were used for these missions but were gradually replaced by B-57Bs and B-57Es. Canberras modified for this duty had the letter 'E' prefixed to the standard designation (i.e. EB-57B) which indicated the installation of special electronic equipment. These aircraft were assigned to three Defense Systems Evaluation Squadrons (DSES), eventually replacing various target towing squadrons which were operating B-57Es. The DSES squadrons operated a number of detachments throughout the US, Canada, and Europe during the 1960s to help train American and allied interceptor units.

During the early 1970s the 4758th DSES was deactivated and its assets were distributed to the 4713th and 4677th DSES. The 4713th DSES operated out of the northeastern United States supplying units for temporary duty in Europe. The 4677th DSES was stationed in the northern reaches of the Midwest supporting units guarding the western and Canadian air approaches to the US. In 1974 the 4713th DSES was deactivated and its aircraft were turned over to two units of the Vermont and Kansas Air National Guard, at the same time the 4677th DSES was redesignated the 17th DSES and continued to fly EB-57Es until it stood down in June of 1979. It was the last USAF unit to fly Canberras. Prior to deactivation the 17th worked extensively with the 190th DSEG (Kansas ANG) and 158th DSEG (Vermont ANG) which operated EB-57Es. The 190th phased out its RB-57s in 1978 and becoming a refueling squadron, but the 158th DSEG continued to operate its EB-57s until 1982 when it converted to F-4Ds. This marked the end of the active use of the Canberra in US service, over thirty years after Roland Beamont first demonstrated the aircraft on a cold winter day at Andrews AFB in 1951.

## Air Intake



(Right) A pair of EB-57Es of the 4677th DSES based at Hill AFB, Utah fly over the snow covered Alaskan countryside testing the defenses of the western approaches to the US. This unit was later redesignated the 17th DSES. (USAF)



(Above) An EB-57A banks over the California coast during tests against Army Nike missile positions. This aircraft served with the Arkansas ANG before being transferred to the Aerospace Defense Command. Note the large number of antennas mounted on the fuselage for the various ECM gear. (Bishop)





(Above) An EB-57B of the 134th DSES, 158th DSEG, Vermont ANG sits on the runway at Offutt AFB, Nebraska during the spring of 1981. The extra large intakes under the engines were added to supply the extra air needed for the generators operating the various ECM gear. (Cockle)

(Below Left) A B-57C of the 117th DSES, 190th DSEG, Kansas ANG is parked on the runway at Dobbins AFB in 1975. The use of the three-tone Southeast Asia color scheme for a DSES aircraft is in contrast to the standard Gloss Gray scheme usually worn by EB-57s of the unit. (R R Leader via R Picciani)

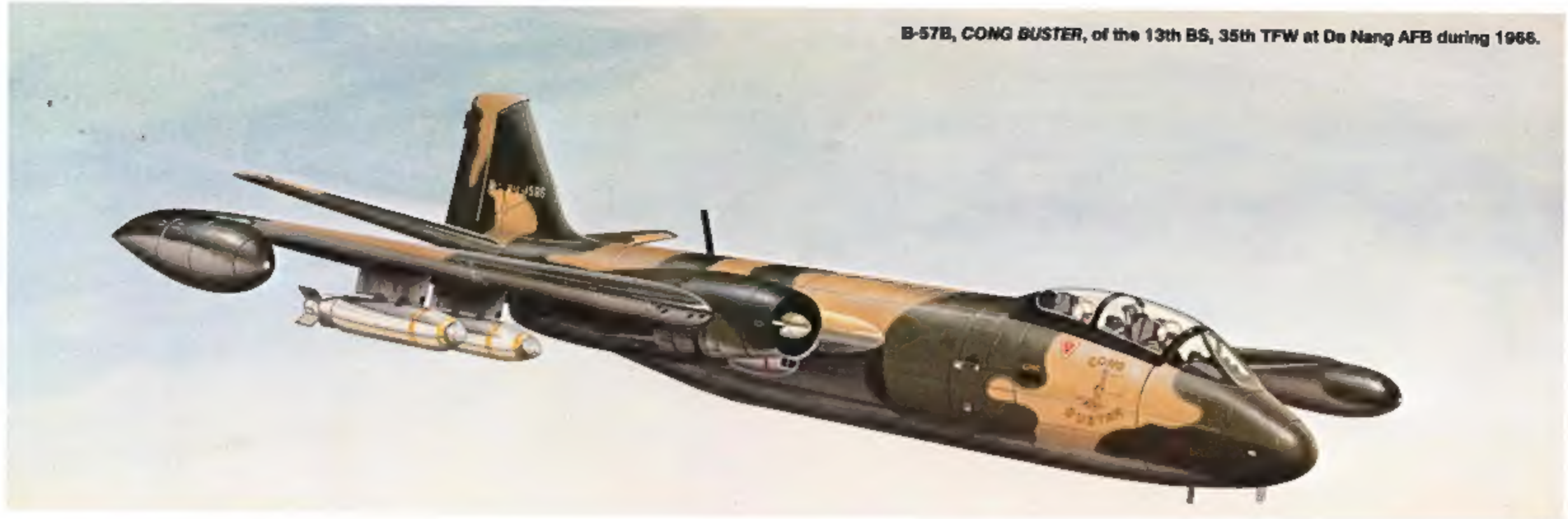


(Below Right) This EB-57E was assigned to the 383rd TRW, first with the 4416th Tactical Electronics Warfare Squadron and later with the 22nd/82nd TRS. (USAF)





B-57B, *CONG BUSTER*, of the 13th BS, 35th TFW at Da Nang AFB during 1966.



B-57C of the 158th Defense Systems Evaluation Group, Vermont Air National Guard during 1977.

